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ABSTRACT

This study was designed to identify the variables that are the strongest predictors of elementary school science achievement in selected schools in the Republic of China. Thirty-eight schools (2950 students) were selected for the study and were representative of large and middle size schools throughout the country. Variables investigated included: (1) student characteristics (age, sex, parental education and occupation, Chinese achievement grade, mathematics achievement grade, and science achievement grade); (2) teacher characteristics (whether the teacher had special inservice training or not); and (3) school size. Grades three, four, and five were involved. Findings indicated that home background accounted for 9-13 percent of the variance for science achievement, scholastic ability added about 20-30 percent to the variance, and previous science achievement contributed about 10-15 percent to the explained variance. Summaries are provided for each grade investigated. Appendixes include a sample science test and test guide translated from the Chinese version and extensive matrices of all variables, as well as an extensive bibliography. (ML)

The Relationships of Achievement, Instruction, and Family Background to Elementary School Science Achievement in the Republic of China

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Tien-Ying Lee, B.S., M.A.

* * * * *

The Ohio State University

1987

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DEDICATION

To my dear parents

Mr. and Mrs. Chin-Chiu Lee

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Finally, I would like to share this dissertation with my family: my loving parents who have worked so hard to let all of their children receive the best education; my dear brothers and their families; and my husband.

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CHAPTER I

INTRODUCTION

BACKGROUND OF STUDY

The Republic of China has been in the process of modifying the country's elementary school curriculum to include Chinese, mathematics, science, social studies, music, art, and physical education, grade by grade since 1978 (Chen, 1977). The curriculum development was completed in the summer of 1984; and begining with that Fall semester, all grades and all subjects have been using the current curriculum. Because the present course of study was different from the previous one, a program related to the introduction of all new curriculum was developed to help teachers become familiar with the revised curriculum and methods.

The goal of the new science curriculum is to prepare scientifically literate persons who will not only have basic science knowledge, but will also acquire love of nature, scientific attitudes, and the ability to apply science processes in daily life (Ministry of Education, 1975). Based on Piaget's developmental theory and influenced by the teaching strategies in Science-A Process

Approach (SAPA), Science Curriculum Improvement Study (SCIS), and Elementary Science Study (ESS), the Committee of Elementary Science Curriculum Improvement developed the current elementary science curriculum to provide hands-on activities and the inquiry teaching approach. The Committee of the Elementary Science Curriculum Improvement expected that children would learn science concepts, processes, and attitudes more effectively.

In order to determine the impact of this science curriculum, a follow-up project was conducted in the Taiwan Provincial Ban-Chyau Teacher Center since 1979. The goals of this project have been to:(1) find problems of the new science curriculum when it is used; (2) develop evaluation tools to investigate science achievement; and (3) collect data related to students' abilities in learning science (Ban-Chyau Teacher Center meeting records, 1979). There were 91 schools which were involved in the project. Each school randomly assigned one class to be an experimental class. From the first to the sixth grade, the same class was kept as an experimental class. Teachers who taught science to an experimental class received two weeks of intensive training from the Ban-Chyau Teacher Center at the beginning of each semester. Both experimental and non-experimental students received a test at the end of each semester that was developed by the project committee. It

was expected that this follow-up study, which ended in the summer of 1986, would provide data to improve the science curriculum for the future.

NEED FOR STUDY

Several research studies related to the new science curriculum have been completed (Lee, 1982; Chang, 1983; Hwang, 1983; Chung, 1983; Shy, 1984). However, none of the studies was concerned with variables that related to student science achievement.

There is a need to identify variables related to science achievement for these students and to determine which significant variables can be emphasized (if positive) and reduced (if negative).

MODEL FOR THE STUDY--DETERMINING SIGNIFICANT PREDICTORS OF SCIENCE ACHIEVEMENT

A review of the literature (see Chapter Two) has identified many variables that have been significant predictors of science achievement. The variables identified support an analysis using a model such as the one proposed by Centra and Potter (1980); their model is shown in Figure 1.

Model of Teaching and Learning

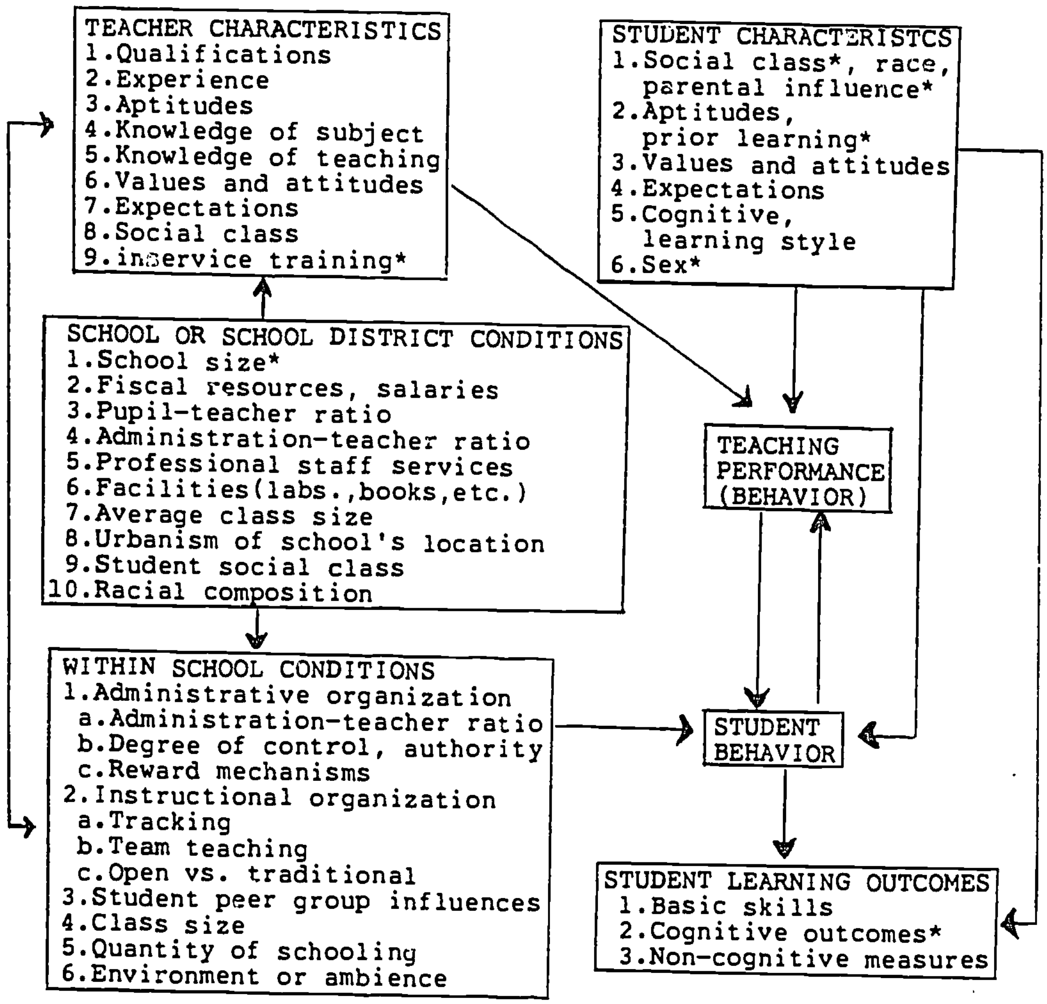


Figure 1: Centra and Potter's Model of Teaching and Learning. * Variables selected for this study.

The model suggests that there are six clusters of variables that interact to affect science achievement. Research data support the impact of these clusters and help to identify which of the clusters and which of the variables within the clusters are most likely to relate to science achievement. Based on the literature review, variables that should account for a substantial amount of the variance and for which data could be obtained for all years of the study (grades three to five) were selected as variables for this study; these variables have asterisks on the variables on Figure 1. The literature suggests they should account for about 60 to 70 percent of the total variance related to science achievement.

Walberg's analysis (1981) supports a similar model. Walberg (1981) stated that there were four principal variables (age or developmental level, student's ability, the social environment for learning, and the home environment) which would account for nearly all of the variance in educational achievement.

The International Association for the Evaluation of Educational Achievement has completed seven international educational evaluations. In the mathematics evaluation (Husen, 1967), the variables which were selected in the study were categorized into three groups which are as follows:

1. student background and schooling variables: grade, age, sex, size of mathematics class, father's and mother's occupation and education, amount of mathematics instruction and homework...etc.;
2. teacher variables: teacher certification, teaching experience, recent in-service training..etc.;
3. school characteristics: school enrollment, type of school, number of trained mathematics teachers...etc..

In the other six evaluations, the variables in the studies were linked into four blocks (Walker, 1976). The four blocks of variables are as follows:

1. background variables: father's occupation, father's and mother's education, use of dictionary, number of books in home, and family size;
2. organizational variables: type of school and type of program;
3. learning conditions variables: instructional situation, methods, materials, teacher qualification and time spent on subject;
4. "kindred " variables: attitudes, interests, etc. which may be looked upon as outcome of education and explanation of differences in achievement.

According to the application of attribution theory in education (Weiner, 1974), achievement is not due to any single variable, but it is due to several interacting

variables. In an instructional setting, variables can be classified into three groups--antecedents, transactions, and outcomes (Yager, 1978). Antecedents are the initial conditions of instructions. These antecedent variables will influence other variables. Transactions refer to the multi-interactions occuring in an instructional setting. Outcomes are the results of interactions between the antecedents and transactions.

Antecedents

Any good achievement prediction model must consider the most important variables. One way of selecting these variables is to determine the explained variance of each. Based on the literature review, certain student characteristics (ability, previous experiences, attitudes, interests) have each been found to explain more than 10 percent and as high as 25 percent of variance.

Teacher characteristics such as preparation, perceptions, sex, age, experience and attitudes usually contribute less than five percent of the variance. Prior training usually accounts for the most variance in this category.

The literature review indicates school climate (physical appearance, community etc.) and science facilities (classroom/laboratory, materials, budget) usually account for about one to nine percent of variance. In the Republic of China, school size is also an indicator of community,

laboratory/classroom, and materials etc.. School size was selected to be an independent variable in this study under the categories of school climate and science facilities.

Home environment such as parents' occupation, family structure and function, and physical features usually accounts for about 10 to 18 percent of the variance related to achievement. Parental education and occupation which usually are the strongest predictors were selected for this category.

Age of students also influences achievement. However, since this study involved students about the same age, data of age were collected to show the sample characteristics, but age was not analyzed as a predictor.

Transactions

Transactions refer to pedagogy, teaching style, social climate, curriculum and system for change (Yager, 1978). In the Republic of China, all elementary schools use the same curriculum, therefore, the curriculum is assumed to be a constant. Instruction can influence the achievement and add significantly to the variance. Instruction in this study is called 'group' and accounts for both the teaching style and pedagogical differences. Other transactions that might influence achievement such as system for change and social climate of the school are not included. The researcher believes these would have modest impact on the

explained variance for the schools involved in this study. Student behavior in the classroom is a possible transaction that might account for some of the explained variance. There are relatively little data to indicate what the impact of student behavior on teacher behavior is; there are even less data to indicate the impact of student behavior on achievement. Due to the difficulty of collecting such behavioral data, these transactions were not included in this study.

Outcomes

Student science achievement is the outcome of this model. The model hypothesizes that student achievement is primarily due to the variables discussed and that a large amount of the explained variance can be identified. From such analyses, useful information can be obtained regarding the achievement of the Chinese students in this program. Information can also be obtained that will allow follow-up research on the unexplained variance in an efficient and cost-effective way.

STATEMENT OF PROBLEM

This study attempts to answer the following questions.

1. Do selected variables relate significantly to science achievement in the third grade?

2. Do selected variables relate significantly to science achievement in the fourth grade?
3. Do selected variables relate significantly to science achievement in the fifth grade?
4. Do variables have consistent prediction across grade three to grade five?

PURPOSES OF THE STUDY

The purpose of this study is to provide basic data to identify the variables that are the strongest predictors of elementary school student science achievement in the Republic of China.

ASSUMPTIONS

The assumptions of this study are as follows:

1. Since the whole country uses the same curriculum, it is assumed that teachers use the same materials.
2. Chinese and mathematics achievement were not measured by the same tests; however, the tests all had equal total score potentials. It is assumed that the final scores on Chinese and mathematics achievement of each semester reflected a reasonable estimate of the student's ability.

DELIMITATIONS

The delimitations of this study are as follows:

1. There were 38 schools selected for this study.
2. One experimental class and one non-experimental class from each school were analyzed.
3. Small schools were eliminated because they did not meet the criteria for study.
4. Grade levels used were the third, fourth, and fifth grade.
5. The available Chinese, mathematics and science tests results were used for analyses.
6. There was no measurement of outside learning experience; only home background data were used.
7. Cognitive learning styles and expectation were not analyzed.
8. The only teacher characteristic examined was the Ban-Chyau inservice teacher education.

LIMITATIONS

The limitations of this study are as follows:

1. Results of this study can only be generalized to the 38 schools due to selection procedures.
2. Contact between teachers within schools is unknown.
3. Generalizations can not be applied to small schools.

4. Generalizations only apply to the third, fourth, and the fifth grades.
5. Generalizations are based on the objectives of available tests.
6. Outside school learning experience is undetermined.
7. The study does not account for variance due to student differences related to cognitive learning styles and expectation.
8. Teacher characteristics were not examined; therefore differences among teachers other than those related to inservice education were not determined.

DEFINITION OF TERMS

Terms which were used in this study are defined as follows.

Term	Definition in this study
New science curriculum	The science curriculum which has been used in the elementary schools in the Republic of China since 1978.
Experimental school	The 91 elementary schools that had been involved in the Project of Elementary School Science Curriculum Study in the Ban-Chyau Teacher Center since 1979.
Experimental classes	After the 91 schools had been selected in 1979, each school assigned one first grade class that year to be an experimental class. The classes continuously served as experimental classes for six years until the students completed the elementary school in 1986.

Experimental group
The experimental classes of the 38 schools that were selected from the 91 schools which composed the experimental group of this study.

Non-experimental group
The group of non-experimental classes of the 38 schools that were selected from the 91 schools comprised the non-experimental group of this study. Students in the non-experimental group received the same science test at the end of each semester as the experimental group since the third grade.

Science achievement
A summative test which was based on the curriculum objectives and designed by the committee of the Project of the Elementary School Science Curriculum Study in the 91 schools at the end of each semester. The results of these tests from grade three to grade five served as science achievement in this study.

Chinese achievement
Final scores for the study of Chinese of each semester from grades three to grade five were used as Chinese achievement. There are six scores of Chinese achievement for each student.

Mathematics achievement
Final scores for the study of mathematics of each semester from grades three to grade five were used as mathematics achievement. There are six scores of mathematics achievement for each student.

Age
Students who were born between the January 1st and Decrmber 31st of 1973 are coded as age 13. Students who were born between the January 1st and the December 31st of 1974 are coded as age 12. The other ages were counted in the same way.

Educational Level of Father and Mother
Six categories of parental education in this study were used: no education at all, no school education but can read and write, elementary school, junior high school (grade 7-9), senior high school (grade 10-12), and college /university and graduate school.

Occupation of Father and Mother

There are 14 categories for father's occupation. They are farmer, worker, engineer, businessman (own stores or work for company), fisher, miner, transportation (bus,taxi, locomotive driver, sailor etc.), teacher, governmental officer, soldier, company (own factory), others (medical doctor, Chinese herb medical doctor etc.), no job, and deceased. There are same 14 categories for mother occupation except changing category 'no job' into 'housewife'.

School size

According to the number of the classes of a school and its community, the department of education of each Shieh government (a unit of local government) has classified schools into three categories. The school that has over 25 classes is called a large school. A school that has 12-24 classes is called a middle school. A school that has fewer than 12 classes is called a small school. School size usually reflects the population of that community. A large school is always located in the city or large town and its class size usually has around 50 students. Middle schools are commonly found in the suburban areas. Class size is between 35-45. A small school is located either at the high mountain area or seashore where the transportation is inconvenient and its class size normaly falls below ten students.

Inservice teacher training

The two-week training program held by the Ban-Chyau Teacher Center for the teachers who would teach science in the experimental classes. This training program was held at the beginning of each semester. The workshops were only offered once for grade three teachers, once for grade four teachers, and once for grade five teachers.

Committee The term 'committee' in this study refers to the Committee of the Project of Elementary School Science Curriculum Study in the Ban-Chyau Teacher Center. The project started in 1980 and ended in the summer of 1986. The committee members included scientists, science educators, educators, and experienced elementary school teachers.

HYPOTHESES

The hypotheses of this study are as follows:

1. The best regression equation for grade three science achievement will include scholastic ability (Chinese and mathematics achievement), father's education, and inservice teacher education (group) as the most significant predictors (.05 level).
2. The best regression equation for grade four science achievement will include previous science scores, scholastic ability (Chinese and mathematics achievement), father's education, and inservice teacher education (group) as the most significant predictors (.05 level).
3. The best regression equation for grade five science achievement will include previous science scores, scholastic ability (Chinese and mathematics achievement), father's education, and inservice teacher education (group) as the most significant predictors (.05 level).

OVERVIEW

This dissertation is organized into five chapters. The first chapter contains the introduction which includes the need of the study, the model for determining the variables in the study, assumptions, delimitations, limitations, and hypotheses.

The second chapter presents a review of related literature which is reported in the following sequence: (1) student characteristcs; (2) teacher characteristics; (3) school or school district conditions; (4) within school conditions; (5) teaching performance; and (6) student behavior.

The third chapter describes the method and procedures including (1) population and sample; (2) treatment; (3) achievement; (4) data collection; and (6) analysis of data.

The fourth chapter reports the results of the analyses of the data.

The fifth chapter presents a summary of the findings, conclusions, discussion, and recommendations.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

The selected model in Figure 1 (see chapter One) includes six components related to student learning outcomes. The literature review is organized with these six groups in order: (1) student characteristics; (2) teacher characteristics; (3) school or school district conditions; (4) within school conditions; (5) teaching performance; and (6) student behavior variables. Selected literature related to these variables are presented in each section.

SECTION ONE: STUDENT CHARACTERISTICS

There are five elements in this section: (1) home background; (2) scholastic abilities; (3) prior knowledge; (4) sex; and (5) other variables.

Home background

There have been several reviews of research and meta-analyses in which home background has been analyzed for its effect on achi ement. Variables have generally yielded mean correlations of .25 to .42 and accounted for a total about ten to 18 percent of the explained variance. Most studies have tended to include both parents' education and occupation in their studies. Some have also included expectations or other home variables.

Findings in the Republic of China

Studies showed that students who had higher social economic status had higher achievement than students who had lower socio-economic status (Lee, 1972; Lu, 1976; Hsieh, 1979; Liu, 1981; Lin, 1982; Kuo, 1983; Ma, 1985).

Among home background variables, father's education was the strongest predictor of student's achievement (Lu, 1976; Chou, 1981; Yao, 1985). Parental education had a stronger impact on student's achievement than parental occupation.

Students whose mothers had professional occupations achieved higher than students whose mothers had non-professional occupations (Wong, 1985; Yao, 1985). The home backgound accounted about eight percent (Lin, 1982) to 25 percent (Chien, 1984) of variance in science achievement.

Findings in the U.S.A and other countries

Kremer and Walberg (1980) conducted a meta-analysis of 26 studies covering 1964 to 1979. They reported a mean correlation between socio-economic status and science learning of .25 (three studies). If parent's education, parent's expectation for student achievement, and science equipment in home are included in the analysis, the mean correlation between home background was .36; about ten percent of variance in science achievement was explained by home background. This finding was similar to Walker's report (1976). Walker (1976) analyzed the six International Association for the Evaluation of Educational Achievement (IEA) studies and found that home background accounted for 11 percent of the variance.

Fleming and Malone (1982) found a mean correlation between home environment and science achievement of .42 for students aged ten with 18 percent of the variance explained; the correlation between socio-economic status and science achievement was .25 (21 studies). Kahl (1982) reported a mean correlation between socio-economic status and science achievement of .30 (nine studies). Walberg (1986) reported a median correlation between home environment and learning in science of .32 (three studies). In the same study, Walberg (1986) demonstrated that home had the second high standardized regression weight ($p < .01$) and

socio-economic status had the third highest standardized regression weight ($p<.05$).

Results of National Assessment of Educational Progress Studies (NAEP, 1971; Norris et al., 1971; Norris et al., 1972; NAEP, 1973; Sauls, 1976; Schibeci & Riley, 1986) showed the same pattern; students whose parents had post-high school education achieved higher than those whose parents did not have post-high school education. Students whose parents had a professional occupation achieved higher than those whose parents had a non-professional occupation.

Sanguinetty (1983) studied academic achievement, school quality and family background in seven Latin American countries. His findings were similar to findings in the U.S.A. He reported that parents' educational background had a strong correlation with student academic achievement. Parental status also showed significance to the child's achievement in Uganda (Abeti, 1983).

Hayes and Kamorman (1983) stated that existing studies did not show that mother's employment had consistent effects on children's educational outcomes.

<u>Scholastic Ability</u>

Scholastic ability includes mathematics ability, language ability , and general ability.

Reviews of research and meta-analyses have also been done that include these variables related to science

achievement. Correlations between ability measures and general science achievement have usually been between .40 and .60 (accounting for 16 to 35 percent of the variance). In addition, these reviews indicate these ability measures are highly correlated with each other (often .60 or higher).

Findings in the Republic of China

No related findings were identified.

Findings in the United States and other countries

Mathematics Ability:

Fleming and Malone (1982) conducted a meta-analysis related to student characteristics and outcomes in science using 302 studies covering the years from 1960 to 1981. They reported that mean correlations between science and arithmetic achievement, and science and mathematics achievement were .77 (three studies) and .42 (13 studies) respectively. Kahl (1982) reported a mean correlation between science achievement and mathematics ability of .46 (eight studies). Both Brown (1983) and Galitsis (1986) found that mathematics achievement was a significant predictor of science achievement.

These studies indicate that mathematics ability accounted for about 16 to 25 percent of variance in science achievement with a mean of about 20 percent and is strongly

related to science achievement involving symbolic and computational skills.

Language Ability:

There have also been several reviews of research and meta-analyses in which language ability has been related to science achievement. Results are generally similar to mathematics ability.

Thorndike (1973) stated that in the international evaluation of reading comprehension, the correlation between science achievement and reading comprehension was .52. According to Thorndike, language ability accounted for about 16 to 25 percent of variance in science achievement.

Fleming and Malone (1982) found a mean correlation between science achievement and language of .41 (five studies). Kahl (1982) reported that a correlation between science and language/verbal ability of .55 (13 studies). Science and reading ability had a mean correlation of .35 (11 studies).

Recent studies (Friend & Wisotsky, 1984; Crocker & Butts, 1986; Horton, 1986) showed that students with higher reading/writing ability achieved significantly higher science scores.

The relationship of language ability to science achievement appears to be consistent over time. Thorndike's results are very similar to the results obtained in more

recent research of the 1970's and 1980's. Language ability generally explains ten to 25 percent of the variance; it is strongly related to science achievement especially for science tests requiring reading skills.

General Ability:

Reviews of research and meta-analyses usually indicate mean correlations of general ability with science achievement of about .40 to .50 (explaining about 16 to 25 percent of the variance). These relationships are again similar to those found for mathematics and language ability.

Boulanger (1980) reported a mean correlation between student science outcomes and general ability of .49 (34 studies). In Fleming and Malone's meta-analysis of science achievement (1982), they reported a mean correlation between science achievement and general ability of .43 (42 studies); the mean correlation between science achievement and IQ was .42 (27 studies).

Kahl (1982) reported that IQ had a mean correlation with science achievement of .42 (27 studies). Walberg (1986) synthesized the research on teaching and reported a mean correlation of ability and learning in science of .48 (10 studies).

On the average, general ability accounted for about 16 to 25 percent of variance in science achievement.

Prior Knowledge

There have been several reviews of research and meta-analyses in which prior learning has been analyzed for its effect on achievement. Results have generally yielded correlations of .40 to .50 and accounted for 16 to 25 percent of the explained variance for upper grades and lower correlations for lower grades. In general, more variance was explained as grade level increased. When home background and scholastic ability were also analyzed, prior knowledge contributed less to the explained variance.

Findings in the Republic of China

No related findings were identified.

Findings in the United States and other countries

Keeves (1985) reported that the correlation between initial science achievement and final science achievement was .61.

Boulanger (1980) did a meta-analysis related to prior knowledge and science learning. He reviewed 34 studies from the sixth to twelfth grades. The studies covered a period of 16 years. He reported that the mean correlations between prior achievement and science achievement was .46 (19 studies). Prior achievement accounted for about 16 to 25 percent of variance related to science achievement; this is typical of many other findings.

Kahl (1982) reported that the correlation between science course background and student outcomes was .19 (six studies) for senior high school students.

Fleming and Malone (1982) showed when data were broken down by age level, at age ten, prior knowledge added a mean of zero percent (18 studies) to the explained variance after home background was removed; at age 14 (21 studies) and 12th grade (18 studies), prior learning added three and nine percent to the explained variance respectively after home background was removed.

After taking out the variance explained by home background, prior knowledge explains less variance. Variance due to prior knowledge decreases substantially for lower grades when home background is included in the analyses.

In general, high correlations are obtained from prior knowledge tests related to course tests. Lower positive correlations are obtained from correlations with previous course background or tests not highly related to the correlated test. Overall, the prior knowledge accounted for about 16 to 25 percent of variance in science achievement.

Sex

Reviews of research and meta-analysis studies revealed that sex differences related to science achievement were small with a mean correlation of .04 and accounted for less than two percent of the variance. Boys achieved slightly higher than girls.

Findings in the Republic of China

No related findings were identified for elementary school science.

Findings in the United States and other countries

Several meta-analysis studies have analyzed the relationship of sex differences to science achievement. Comber and Keeves (1973) stated that boys achieved better than girls in science (one-fourth of a standard deviation) from a study of 19 countries. They also reported that sex accounted for two percent of variance in science achievement.

The correlations between science achievement and sex reported from different studies were similar. Fleming and Malone (1982) reported a mean correlation of .04 (nine studies). Kahl (1982) reported a mean correlation of .05 (41 studies).

Results from National Assessment of Educational Progress studies (Herman, 1975; Haertel et al., 1981; deBenedictis et al., 1982; and Hueftle et al., 1983) consistently revealed that boys achieved slightly higher than girls.

Lewis and Hoover's longitudinal study (1983) showed that girls scored consistently better than boys in language. However, a meta-analysis review (Maehr & Steinkamp, 1983) showed that boys consistently achieved slightly higher than girls in elementary school science.

Erickson and Erickson (1984) demonstrated that the sex difference in science achievement was not significant at early ages, but a difference developed and increased with age (favoring boys).

Other variables

Other variables within this category in this model are: (1) values and attitudes; (2) cognitive and learning styles; and (3) expectations.

Findings in the Republic of China

No related studies were identified.

Findings in the United States and other countries

Fleming and Malone (1982) reported a mean correlation between science achievement and attitude of .23 (seven studies). Kahl (1982) stated that the correlation between science and attitude/ motivation was .31 (four studies). Walberg (1986) reported that science correlated with motivation with a mean of .33 (40 studies). In his report of regression of science achievement on science attitude, Walberg (1986) stated that the regression weight was significant ($p<.05$). Walberg found the variables in this category accounted for one to nine percent of variance in science. Attitudes, cognitive and learning styles and student expectations and movitation appear to account for about six to ten percent of the variance related to achievement (Howe & Butts, 1986) when home background and ability are removed.

Family background measures often relate significantly to these variables. Students with positive attitudes, high motivation and high expectations frequently are from homes with parents with a higher level of education.

Summary of Findings of Section One: Student Characteristics

The correlation between home background and science achievement ranged from .25 to .42; it accounted for ten to 18 percent of variance. Parent's educational level had the strongest influence on student's learning.

Scholastic ability (mathematics, language, and general ability) showed slightly higher correlations (around .40 to .50). About 16 to 25 percent of variance in science achievement was explained by scholastic ability.

Prior knowledge had moderate correlations to science achievement and accounted for 16 to 25 percent of variance in science achievement as a single correlate. When home background and scholastic ability were included, prior knowledge contributed less.

These variables are antecedents to student achievement and have consistently accounted for a substantial amount of explained variance. Any research study attempting to determine the impact of instruction on students and the resulting of student achievement needs to obtain and analyze data on these variables. Other variables such as motivation, cognitive and learning styles and student

expectations may account for up to 16 percent of the variance and should also be considered; some of the explained variance of these variables is also accounted for by achievement and home background.

SECTION TWO: TEACHER CHARACTERISTICS

Teacher characteristics refer to teacher's qualifications, experience, aptitude, knowledge of subject and teaching, values and attitudes, expectations and social class.

Reviews of research and meta-analyses have also been done related to the teacher characteristics and science achievement. The mean correlations tend to be low compared to student characteristics. Data on teacher characteristics usually account for less than five percent of the variance in science achievement.

Druva & Anderson (1982) completed a meta-analysis study that indicated the relationships between teacher characteristics and (1) teacher's classroom behavior and (2) student's outcomes were low. Results showed that the correlation coefficients between teacher characteristics and their effectiveness in teaching ranged from -.07 (23 studies) to .19 (33 studies) with a mean correlation of .05. The correlation between teacher effectiveness and science training was .13 (28 studies). Other variables under the category

of teacher characteristics had less impact on teacher behaviors and science achievement.

The General Accounting Office (1984) cited Colin Byrne's study that showed that there was no consistent relationship between the teachers' measured knowledge and their students' achievement. However, Evertson et al. (1984) stated that "teachers with good instructional capabilities would be more effective if they had good knowledge of subjects they teach".

Levis (1985) stated that the teacher's attitudes toward himself influenced his behavior in the classroom and that a teacher's attitude toward students--expectation, would influence student's achievement. Purkey and Smith (1983) in a review of research on effective schools indicated that high teacher expectation was one of the variables related to effectiveness. Braun (1985) stated that teacher's expectation did affect student's self-expectation which became the student's motivation; the students' motivation influenced their achievement. However, Biddle (1985) stated that the relationship between teacher expectation and their behaviors in classroom was not clear.

Barnes (1985) reviewed research results and stated that after the early years in the classroom, a teacher had a tendency to reject innovation. Barnes stated teacher characteristics had a low correlation with student's achievement.

Inservice education has been found to be significantly related to science achievement and especially to teachers teaching a specific curriculum related to the inservice education. Studies related to inservice education are discussed in this section, since it is a major variable included in the study. Inservice education that is imparting specific knowledge, attitudes, and expectations may serve as a broad variable for assessing some potential difference between teachers who have had inservice education and those who have not.

Findings in the Republic of China

Ouyand (1983) compared the differences between two groups of teachers--one group received the inservice training from the Ban-Chyau Teacher Center (same training program in this study); one group did not receive this training. He found that two groups of teachers had equal knowledge of basic science concepts and similar philosophies of science teaching. The two groups of teachers had different attitudes toward science and different preferences for methods of teaching science. If these differences are educationally significant, there should be differences in achievement of their pupils.

Findings in the United States and other countries

Some studies showed that inservice teacher training had a significant impact on teachers (Hunkler, 1971; Bedwell, 1974; Hounshell & Liggett, 1976; Champagne, 1980; Bethel et al., 1982; Druva & Anderson, 1982; Cooper, 1983; Ellis & Zielinski, 1983; Riley & Failer, 1983; Ouyand, 1983; Halperin, 1985; Lawrenz, 1986). However, fewer researchers attempted to determine if inservice education impacted student learning. Some studies reported significant impact on students (Hunkler, 1971; Pinkall, 1973; Hounshell & Liggett, 1976; Champagne, 1980). Druva and Anderson (1982) reported that inservice teacher training had a positive impact on student's learning. Penick and Johnson (1985) reviewed teachers with exemplary programs and reported that when inservice teacher training programs were designed by teachers and used actual materials and strategies to be used in real classroom, inservice teacher training was effective.

SECTION THREE: SCHOOL OR SCHOOL DISTRICT CONDITIONS

This category includes: (1) school size; (2) fiscal resouces, salaries; (3) pupil-teacher ratio; (4) administration-teacher ratio; (5) professional staff services; (6) facilities (labs., books, etc.); (7) average class size; (8) urbanism of school's location; (9)student social class; and (10) racial composition.

In the Republic of China, large size schools (over 25 classes) are located in the inner cities or large towns. Middle size schools are located in the suburban areas of large cities or towns. Large size schools have a higher pupil-teacher ratio and administrater-teacher ratio, larger class size, and better facilities. Student social class is also related to school size; more parents of students in large schools have higher professional occupations; more parents of students in middle size schools, have non-professional occupations. Teacher salaries depend on teaching experience and not on school size.

Based on Wong's (1982) study, school size was selected as a broad measure of some of the differences between the large and middle size schools. Literature primarily related to school size is reported in this section.

Findings in the Republic of China

Wong (1982) did a survey of the differences among schools in the Republic of China. He reported that there was no significant difference between large and middle size schools in facilities, quality of teachers, principal's leadership and students' parental education and parents' concern about student's learning. Teacher's attitudes toward teaching and their concern about their students were lower in middle size schools.

Findings in the United States and other countries

According to Centra and Potter (1980), major studies and reviews showed that there was a slight relationship between school difference and student achievement. The school effects were underestimated and confounded by student's background variables.

Brookover et al. (1979) stated that school size was not a strong variable associated with students learning outcomes and that even some studies revealed that small schools showed a minor advantage. However, Comber and Keeves (1973) reported that in the IEA's science evaluation, three countries (19 countries) showed that large size schools achieved better than small schools.

The National Assessment of Educational Progress of science showed that students who lived in affluent suburban areas achieved above the national average; students who lived in the inner city and rural areas achieved below the nationwide average (NAEP, 1971; NAEP, 1973; Sauls, 1976; NAEP, 1977; Ahmann, 1982).

SECTION FOUR: WITHIN SCHOOL CONDITIONS

This category includes (1) administrative organization: administration-teacher ratio, degree of control, authority, reward mechanisms; (2) instrucational organization: tracking, team teaching, open vs. traditional; (3) student peer

group influences; (4) class size; (5) quantity of schooling; (6) environment or ambience.

In the Republic of China, school days, school hours and instructional organization are nearly the same for all elementary schools. There is also little difference in formal reward mechanisms. Administrater-teacher ratio, school environment and class size are dependent on school size in China as indicated earlier.

There is more direct influence on both teachers' and students' behavior from within school conditions than from school or school district conditions. Quality of schooling and instructional organization (Howe, Blosser, Suydam, Helgeson, & Disinger, 1986) have been found to be significant variables that related to student achievement. An inservice program that emphasizes specific within school variation may account for same differences.

Findings in the Republic of China

No related studies were founded.

Findings in the United States

Purkey and Smith (1983) stated that an effective school had five characteristics: (1) strong administrative leadership; (2) high expectations for children achievement; (3) an orderly atmosphere and conditions to learn; (4) an emphasis on basic-skill learning; and (5) frequent monitoring of pupil progress.

Walberg (1986) showed that the median correlation of peer group was .24 (two studies) for science studies. In the same study, Walberg (1986) also showed that the standard regression weight of achievement of peer influence was significant ($p<.05$). Compared to other variables, the peer influence regression weight was the smallest. It meant that the peer influence had the least contribution to variance of achievement.

SECTION FIVE: TEACHING PERFORMANCE

When Centra and Potter (1980) explained their model, they did not give a list of specified items about teacher performance as they did in explanation of student/teacher characteristics and school or within school conditions. However, they emphasized the teacher's performance in reinforcement, questioning behavior, classroom control and time on task. For this review performance and behaviors are classified as (1) type of teaching behaviors, (2)quality of teaching behaviors and (3) quantity of teaching behaviors. Related literature is presented in this section.

Findings in the Republic of China

No related studies were found.

Findings in the United States and other countries

Type of teaching behaviors

Centra and Potter (1980) reviewed studies and stated that the teacher's reinforcement behavior initiated student's participating in-class talking. They also reported that the teacher's control behavior (classroom management) made differences on student's achievement.

Lott (1982) did a meta-analysis related to inductive/deductive teaching. He reported that inductive teaching had a positive effect size. Walberg (1986) synthesized studies and reported that the effects of direct teaching had a mean correlation of .23; effect of praise on achievement was .08.

Several of the meta-analysis studies (Wise & Okey, 1982; Shymansky, Kyle, & Alport, 1980; Walberg, 1980; Boulanger, 1980) identified various teaching strategies and teaching behaviors. Data are presented in these studies indicating the relative effect sizes obtained with the use of various techniques.

Quality of teaching behaviors and achievement

Wise and Okey (1982) showed that the effect size of various science teaching strategies on student's achievement ranged from .90 (four studies of wait-time) to -.15 (14 studies of grading). Boulanger (1980) in a review research

also found that experimental instructional techniques had positive effect size. Shymansky, Kyle, and Alport (1982) reported that inquiry teaching techniques produced increased achievement on an average about one-third of standard deviation. Walberg (1986) stated the effect of higher/lower cognitive questions had a mean correlation of .73 (20 studies). He reported that the standardized regression weight of the quality of instruction was not significant. Welch et al. (1986) used national assessment data to predict elementary science achievement. They reported that quality of instruction had a correlation with science achievement of .01.

Data in these studies show that the quality of the instruction usually makes a significant difference in achievement. Effect sizes for various instruction strategies vary substantially from study to study. Effect sizes for instruction strategies also differ when analyzed for different achievement outcomes.

Quantity of instruction related to achievement

Studies of effective schools showed that time on task and time related to the objectives were among the most important variables to make a school different (Centra & Potter, 1980; Smyth, 1981; Howe et al., 1986) from usual schools.

Walberg in a review of research (1986) reported that quantity of instruction correlated to student's achievement from .13 to .71, with a median of .40. After student's family background, ability and other variables are removed, the correlation between quantity of instruction and student's achievement ranged from .09 to .60 with a median of .35. Welch et al.(1986) reported that both quality and quantity of teaching were not predictors of science learning for nine-year-old students in their study.

Summary

In general, teacher performance and behavior had an impact on student's achievement. However, compared to other student variables such as home background and ability, teacher performance and behavior usually have contributed less variance.

SECTION SIX: STUDENT BEHAVIOR

Centra and Potter (1980) did not specify subitems for student behaviors in their model. They stated that student behavior was "the covert thought processes triggered by teaching performance as well as the overt responses that a classroom observation system might identify" (p.295).

Literature indicated that student behavior included listening, discussion, peer influence, hands-on activities ect. (Bredderman, 1982). Studies reviewed indicated that

high achievers always showed more involvement in class activities than did low achievers; Examples include such items as more peer interaction (Debus, 1985); raise their hands more often (Tisher, 1985); and more time on courses (Tisher, 1985). Time engagement was an important factor. Research has indicated academic learning time accounted for 20 percent of variance of achievement (Tisher, 1985); but, Tisher's study did not control student ability. Ability was a 'confounded variable' when considering engagement and achievement in Tisher's study.

Research showed the relationship between a student's behavior and his achievement was not so simple. It is a complex area of study (Cairns, 1985; Symth, 1985).

SUMMARY OF LITERATURE REVIEW

Student characteristics

Student characteristics showed that student home background accounted for about ten to 18 percent of the variance of achievement. Within home background, parental education was the strongest predictor. Based on the literature review, parental education and occupation were selected for analyses in this study.

Since student's science achievement was correlated significantly to mathematics, language, and general ability, mathematics and Chinese were selected for this study to

account for student abilities (numerical and language). Because general ability is usually highly correlated to mathematics and language, it was not included in the analyses.

Prior knowledge was reported to have the highest independent correlation when measured by a test that related to the achievement. Therefore, previous science test results were selected as an important variable to analyze.

Sex accounted for about two percent of variance. Even though it has not explained much variance in previous research, it was included because data on this variable at the elementary school level were not included in many studies in the Republic of China.

Other variables such as cognitive development and learning styles, expectations, values and attitudes were not selected as variables. They may account for variance that this study does not explain.

Teacher characteristics:

Literature reviews showed that expectations, attitudes, and knowledge were variables that may influence student learning; however, the amount of explained variance usually has been small. Inservice teacher education was seleted to test the global impact of these variables related to the science curriculum.

School or school district conditions:

Centra and Potter (1980) indicated that there were low correlations between gross school differences and student student achievement. However, they also indicated that the impact of school size had been confounded by student's background variables.

In the Republic of China, many variables in this category related to school size. Therefore, school size was selected in this study.

Within school conditions

Research reviews indicated some within school conditions related to student achievement. Since the number of school days, the time for instruction, and the organization of instruction are essentially the same in these schools, no variables were selected. School climate might be a variable that would add to the explained variance.

Teaching performance and student behaviors

Literature showed that teacher's in-class behavior frequently influenced the students' behavior which influenced their achievement. Inservice teacher education was selected to account for differences between sample teachers as a global measure. The variance of student achievement explained by student behavior is not clear. No variable related to student behavior was selected.

CHAPTER III

METHOD AND PROCEDURE

This chapter includes five sections. The first section describes the population and sample. The second section describes the treatment. The third section discusses assessing achievement. The fourth section describes the collection of data. The fifth section relates to data analyses.

SECTION ONE: POPULATION AND SAMPLE

Population

The population was comprised of 91 elementary schools that had been involved in elementary science curriculum development in the Republic of China. The schools were initially selected by the local governments to be part of a science curriculum improvement study. According to the data from the Ban-Chyau Teacher Center, some of these 91 schools were randomly selected, and some of them were assigned to the experimental program due to their involvement in science curriculum development since 1970. The 91 schools are located throughout the country and are in each of the 22

political districts in the Republic of China. The distribution of the schools is closely related to the percentage distribution of the population. About 52 percent of the experimental schools were located in urban areas; approximately 66 percent of the population lives in urban areas in the Republic of China (The world book encyclopedia, 1984).

Sample

The sample schools were selected from the 91 schools. Three steps were taken to select and retain schools that could be analyzed: (1) the study included only those that had at least five semesters of science test results including the first semester of the third grade and the second semester of the fifth grade; (2) insufficient data on parental occupation or (their) education also eliminated schools from the study; and (3) small schools (schools with enrollment of less than 12 classes) were deleted from this study because non-experimental classes were not available. The elimination of schools from the population is presented on Table 1.

The non-experimental class for each school was randomly selected from classes that were in the same grade as the experimental class of each experimental school.

Table 1

Number of Schools Selected and Deleted from the Population

Explanation	No. of Schools
Total schools in population	91
Removed due to school size(small schools)	20
Removed due to lack of science test results	30
Removed due to missing data	3
Total sample schools	38

SECTION TWO: TREATMENT

Inservice Education

The study compared classes of teachers who had recieved inservice education to those in the same schools who had not. The teachers who taught the experimental classes attended a two-week training program, held by the Ban-Chyau Teacher Center, at the beginning of each semester. The contents of the two-week training program included lectures on learning theories, teaching methods, evaluation, and hands-on activities on all science units of the following semester. Teachers also went to the local elementary schools to observe model teachers' teaching or to practice teaching themselves.

Depending on the school site and time, professors from the junior teacher colleges visited the experimental schools once per semester. When professors came to the

schools, they usually observed the learning environment first. Then, professors either "observed" teachers teach science or discussed problems in teaching science with the teachers personally or in a group.

Enrollment of Students in the Experimental Program

The cumulative effect of teacher training was the second treatment of this study.

Students who were in the experimental classes, except those who transferred to other schools, stayed in the experimental classes until they completed elementary school. No new student was admitted into the experimental class after the first semester of the first grade. From the first grade to the sixth grade, experimental classes' science teachers received the two-week training every semester.

SECTION THREE: ACHIEVEMENT

Testing of Science Achievement

Test Used

The Science Evaluation Test for each semester was designed by the Committee of the Project of Elementary School Science Curriculum Study in the Ban-Chyau Teacher Center. The test was given to experimental students at the end of each semester and also to non-experimental students. A sample of the test is included in Appendix B.

Test Validity

Based on the objectives of the science curriculum, the committee developed tests for each semester.

After the first version of a test was developed, it was tested by elementary schools close to the Ban-Chyau Teacher Center. The committee members analyzed the test for difficulty and discrimination of items. Some items were dropped and some items were modified. The second trial was given to the experienced teachers' schools. The second modification was reviewed by the committee. Further trials were also completed until committee members agreed on the items.

The committee members included scientists, science educators, and selected elementary school teachers (committee members are listed in Appendix A). Based on these reviews the science tests had strong face and content validity.

Test Reliability

No data were available from previous work. Data were obtained for reliability analyses in this study. Table 2 presents reliability data (KR-20) for each semester test. Reliabilities ranged from .684 for grade three to .796 for grade five. The test with the lowest reliability had two fewer items than the others.

Table 2

Reliability (KR-20) of the Science Tests for Sample Students

Test	No. of items	KR-20	No. of Students
grade 3, semester 1	18	.684	2759
grade 3, semester 2	20	.731	2543
grade 4, semester 1	20	.780	2122
grade 4, semester 2	20	.752	2851
grade 5, semester 1	20	.770	2884
grade 5, semester 2	20	.796	2929

Test Administration

At the end of each semester, all students in each school completed the same science test on the same day. The tests for the experimental classes were administered by committee members and the other classes were given the test by the classroom teachers.

Both the committee members and the classroom teachers used the same Test Guide to give the test. When the committee member administered the test to the experimental class, the class teachers of the non-experimental classes in the same grade in the same school observed. Then, these teachers presented the same test to their students.

The criteria for correct answers were specified in the Test Guide; all tests were graded using the same criteria. An example of the Test Guide is also in Appendix B.

Determination of Chinese and Mathematics Achievement

In elementary schools, the number of quizzes depended on classroom teachers. However, the government required that every school have three monthly tests, and one final test for Chinese and mathematics each semester. Within one school, all students took the same tests. Quizzes were an exception. Tests were either designed by school teachers or the Department of Education of the Shieh government to which the school belonged. Results of quizzes, monthly and final tests were calculated to determine a final score for the course of that semester. These final scores represented Chinese and mathematics achievement in this study.

SECTION FOUR: DATA COLLECTION

Collection of data is disscussed under the following subheadings: (1) school size; (2) teacher training; (3) personal background variables including Chinese and mathematics achievement, student's age and sex, and parental occupation and education level; and (4) student's science scores.

School Size

School size information was obtained from the Ban-Chyau Teacher Center.

Teacher Training

Information on which classes were experimental or non-experimental classes was provided by the Ban-Chyau Teacher Center.

Obtaining Personal Background Variables of Students

In May of 1986, the researcher wrote a letter to the Ban-Chyau Teacher Center to ask schools to help collect the information of both experimental and non-experimental students' parental occupation and education, student's age and sex, and Chinese and mathematics achievement from the first semester of the third grade to the second semester of the fifth grade. On August 3, 1986, the researcher went back to the Republic of China to collect all data.

Personal background variables were all obtained from school records. Three schools could not supply personal background data; these schools were dropped from the study.

Obtaining Science Test Scores

Student science scores were obtained from the Ban-Chyau Teacher Center. In August of 1986, the researcher together with five college students worked in the Ban-Chyau Teacher Center to pick out and record students' science test

results. The recording of data was double checked. Inconsistencies were corrected or eliminated.

SECTION FIVE: DATA ANALYSES

Introduction

The main purposes of this study were to determine the strong predictors of student science achievement and the probable impact of the inservice education program for elementary school teachers. Data analyses used are discussed in five parts: (1) coding of da (2) category codes and codings; (3) frequencies and correlations of variables; and (4) regression analyses.

Coding of Data

Chinese, Mathematics and Science Achievement

Chinese, mathematics and science achievement were obtained as numerical numbers and used as received.

Parental Occupation and Education

Parental occupation and education were coded dichotomously into categories. If the student's parent's data applied to the category, the category was coded as one; if not, it was coded as zero.

Other Variables

Other variables were coded as follows:

group: the experimental group in which the teacher was trained was coded as one; the non-experimental group which represented no training was coded as zero;

school size: a large size school was coded one; a middle school was coded as zero;

sex: one and zero were used for male and female respectively;

age: student's actual age in 1986.

Category Codes and Codings

In order to help readers understand the procedures in this chapter, the results of the next chapter, and tables in Appendix D, the variables and the abbreviations are listed in Appendix C.

Frequencies and Correlations

The steps in this part were as follows: (1) determined frequencies for all variables and (2) produced correlation matrices for all variables.

This information was used for elimination of some variables; it also helped to identify other analyses that needed to be done. Variables with frequencies including less than one percent of the sample were dropped from further

analyses. These were dropped due to the possibility that significant correlations might enter the regression statements and block variables with higher percentages of students involved. The variables deleted included: (1) father's occupation categories of miner, company (own factory), no job, and deceased; and (2) occupation of mother categories of engineer, miner, transportation (bus driver etc.), soldier, company (own factory), others, and deceased. No other items were deleted.

Regression Analyses

Regression Analyses Related to Chinese Achievement

One stepwise multiple regression analysis was run for each semester. The personal background variables including student's age and sex, parental occupation and education and school size were the independent variables and the Chinese achievement of each semester was the dependent variable. There were six regression analyses for Chinese achievement. The amount of variance accounted for by student background variables for Chinese achievement (language fluency) can be indicated from these analyses.

Regression Analyses Related to Mathematics Achievement

One stepwise multiple regression analysis was run for each semester. The personal background variables and school size were the independent variables. The dependent variable was the mathematics achievement of each semester. The results of the analyses should be able to explain the amount of variance for mathematics achievement accounted for by the student background variables.

Regression Analyses Related to Science Achievement

Except for the first semester of the third grade, three stepwise multiple regression analyses were run for each semester. These stepwise multiple regression analyses were run in the following sequence: (1) personal background variables such as student's age and sex, parental education and occupation, and school size were independent variables; science achievement of that particular semester was the dependent variable; (2) personal background, school size, Chinese and mathematics achievement were independent variables; science achievement of that particular semester was the dependent variable; and (3) personal background, school size, Chinese, mathematics and previous science achievement were independent variables; science achievement of that particular semester was the dependent variable.

Since there was no previous science achievement for the first semester of the third grade, only the first two analyses above were run for that semester.

Regression Analyses of Impact of Teacher Training on Student Science Achievement

The variable 'group' was used to distinguish teachers who had received training held in the Ban-Chyau Teacher Center from those who had not.

The procedures of analysis were as follows: (1) multiple regression was used to determine variance of science achievement explained by variable 'group' for total sample; and (2) the top and bottom quarter classes based on science achievement were analyzed to check the relationship of 'group' to these classes.

CHAPTER IV

RESULTS

There are four sections in this chapter. The first section presents frequencies of all selected variables in this study to show the sample characteristics. The second section presents the correlation matrices of all variables. The third section presents results of the multiple regressions. The fourth section presents data related to the tests of the hypotheses.

SECTION ONE: SAMPLE CHARACTERISTICS

Descriptive data for parental occupation and education, school size, group, and student's age and sex are presented. Data for Chinese, mathematics, and science achievement are included.

School Size

Data related to school size and distribution of students by school size are presented in Table 3. Within the 38 schools there were 27 large size schools and 11 middle size schools. About 75 percent of the students were in large schools and 25 percent in middle schools.

Table 3

Sample Distribution of Schools and Students by School Size

School Size	Number of Schools	Percent	Number of Students	Percent
Large school	27	71.1	2217	75.2
Middle school	11	28.9	733	24.8
Total	38	100.0	2950	100.0

Number of Students by Group

The distribution of experimental and non-experimental group students is presented in Table 4. The total number of students in the non-experimental group was about five percent more than the experimental group.

Table 4

Number of Students in Experimental and Non-experimental Groups

Group	No. of Students	Percent
Non-experimental Group	1550	52.5
Experimental Group	1400	47.5
Total	2950	100.0

Class Size

The distribution of class size for grade five experimental and non-experimental groups is presented on Table 5. The most common class size for the experimental group was between 36-40 students; mean class size was 37. The most common class size for non-experimental classes was between 40-45 students; mean class size was 41. The difference may have been caused by the fact that students in the experimental group could move out of the experimental class, but no student could move into the experimental class after the first semester of the first grade.

Class size was not used as a variable in analyzing science achievement because actual enrollments for grades three and four could not be determined. However, the mean for experimental classes would be smaller than for the non-experimental classes.

Table 5

Distribution of Frequency of Class Size for Experimental and Non-experimental Group

Class Size	Experimental Group		Non-experimental Group	
	Number	Percent	Number	Percent
51-55	0	.0	3	7.9
46-50	5	13.1	8	21.0
41-45	6	15.8	16	42 2
36-40	11	28.9	3	7.9
31-35	6	15.8	4	10.5
26-30	10	26.4	0	.0
20-25	0	.0	4	10.5
Total Classes	38	100.0	38	100.0

Sex

Table 6 shows the ratio of boys to girls. In this study, there were more boys than girls.

Table 6

Distribution of Boys and Girls in Total Sample

Category	No. of Students	Percent
Female	1439	48.8
Male	1511	51.2
Total	2950	100.0

Table 7 is the distribution of boys and girls in experimental and non-experimental groups.

Table 7

Distribution of Boys and Girls by Group

Group	Experimental		Non-experimental	
	Number	Percent	Number	Percent
Female	681	48.6	758	48.9
Male	719	51.4	792	51.1
Total	1400	100.0	1550	100.0

Age

Table 8 presents the distribution of students by final age. The majority of the students were 12-years-old in 1986. This is as expected since the data were obtained for the sample when they were in the sixth grade and most would be this age if they entered school at the usual time and passed each year.

Table 8

Frequency Distribution of Students by Age

Age	No. of Students	Percent
11	28	.9
12	2269	76.9
13	643	21.9
14	6	.2
15	1	.0
missing data	3	.1
Total	2950	100.0

Father's and Mother's Occupations

Tables 9 and 10 show the distribution of father's and mother's occupations respectively. Table 9 shows that the two most common occupations for fathers were worker and businessman. Businessman may be recognized as a middle-social-economic level and worker is considered as a lower level socio-economic status in the Republic of China. Table 10 shows most of the mothers worked as housewives.

Table 9

Frequencies of Father's Occupation

Category	No. of Students	Percent
Farmer	392	13.3
Worker	901	30.5
Engineer	33	1.1
Businessman(own stores)	762	25.8
Fisher	157	5.3
Miner	4	.1
Transportation(bus driver etc.)	116	3.9
Teacher	94	3.2
Govermental Officer	251	8.5
Soldier	51	1.7
Company(own factory)	23	.8
Others(M.D. etc.)	72	2.4
No Job	6	.2
Deceased	27	.9
Missing data	61	2.1
Total	2950	100

Table 10

Frequencies of Mother's Occupation

Category	No. of Students	Percent
Farmer	82	2.8
Worker	238	8.1
Engineer	1	.0
Businesswoman(own stores)	216	7.3
Fisher	51	1.7
Miner	1	.0
Transportation(Driver etc.)	2	.1
Teacher	46	1.6
Governmental Officer	56	1.9
Soldier	1	.0
Company(own factory)	10	.3
Others(M.D. etc.)	15	.5
Housewife	1947	66.0
Deceased	4	.1
Missing data	280	9.5
Total	2950	100.0

Father's and Mother's Educational Level

Tables 11 and 12 present the frequency distributions of the father's and mother's educational level respectively. Table 11 and Table 12 show that the highest educational level for about half of the parents was elementary school. About 35 percent of the fathers and 20 percent of the mothers had completed high school. About 11 percent of the fathers and three percent of the mothers had completed college.

Table 11

Frequency Distribution of Father's Education

Category	No. of Students	Percent
No Education	66	2.2
No Ed. but can read & write	38	1.3
Elementary School	1401	47.5
Junior High School	496	16.8
Senior High School	530	18.0
College/University plus	314	10.6
Missing data	105	3.6
Total	2950	100.0

Table 12

Frequency Distribution of Mother's Education

Category	No. of Students	Percent
No Education	188	6.4
No Ed. but can read & write	38	1.3
Elementary School	1634	55.4
Junior High School	343	11.6
Senior High School	263	8.9
College/University plus	89	3.0
Missing data	395	13.4
Total	2950	100.0

Achievement Scores

Chinese Achievement

The Chinese achievement results are shown in Table 13. Results for grade levels varied from a mean of 83.9 to 85.3. These means indicate the tests were mastered by a high percentage of the students .

Table 13

Chinese Achievement Results

Grade	Mean	S.D.	No. of Students	Total Score
Third-S1*	84.524	15.598	2949	100
Third-S2	84.415	15.663	2949	100
Fourth-S1	85.056	15.757	2949	100
Fourth-S2	85.262	15.474	2949	100
Fifth-S1	84.005	15.404	2949	100
Fifth-S2	83.893	15.119	2949	100

* S after grade indicates which semester the achievement was determined.

Mathematics Achievement

Table 14 presents the Mathematics achievement results. The mean for mathematics achievement shows a continuous decrease as grade increased. The standard deviation also increased as grade increased.

Table 14

Mathematics Achievement Results

Grade	Mean	S.D.	No. of Students	Total Score
Third-S1*	83.778	16.922	2946	100
Third-S2	81.825	17.394	2949	100
Fourth-S1	78.565	18.809	2949	100
Fourth-S2	77.832	19.563	2949	100
Fifth-S1	74.142	20.606	2949	100
Fifth-S2	72.979	21.336	2949	100

* S after grade indicates which semester the achievement was determined.

Science Achievement

Table 15 shows the science test results for both groups. The mean for the science achievement shows a slight decrease for the last two semesters. The reason for the decrease is not known at this time.

The science test results for experimental and non-experimental groups are presented in Table 16 and Table 17 respectively.

Table 15

Science Test Results for Total Sample

Grade	Mean	S.D.	No. of Students	Total Score
Third-S1*	12.683	3.137	2759	18
Third-S2	12.232	3.715	2543	20
Fourth-S1	12.028	4.166	2122	20
Fourth-S2	12.928	3.827	2851	20
Fifth-S1	11.929	4.025	2884	20
Fifth-S2	11.709	4.194	2929	20

* S after grade shows which semester the test was given.

Table 16

Science Test Results for Experimental Group

Grade	Mean	S.D.	No. of Students	Total Score
Third-S1*	12.868	3.01	1342	18
Third-S2	12.197	3.74	1352	20
Fourth-S1	12.098	4.23	1361	20
Fourth-S2	13.113	3.85	1382	20
Fifth-S1	11.938	4.10	1380	20
Fifth-S2	11.945	4.09	1392	20

*S after grade shows which semester the test was given.

Table 17

Science Test Results for Non-experimental Group

Grade	Mean	S.D.	No. of Students	Total Score
Third-S1*	12.508	3.24	1417	18
Third-S2	12.272	3.69	1191	20
Fourth-S1	11.904	4.05	761	20
Fourth-S2	12.754	3.79	1469	20
Fifth-S1	11.920	3.96	1504	20
Fifth-S2	11.496	4.27	1537	20

* S after grade shows which semester the test was given.

SECTION TWO: CORRELATIONS BETWEEN VARIABLES

The correlation matrices for all variables are presented in Appendix D. The correlations between science achievement and group are presented in Tables 18 and 19. Since the significant correlations between variables will show on the regression results, no other correlation tables are presented in this section.

Correlations between Science Achievement and Group

The correlations between six semesters of science achievement and group for all students are shown in Table 18. Results show that correlations were significant for three semesters and favored the experimental group. The correlation coefficients were low and accounted for less than one percent of the variance.

The correlations between group and top/bottom quarter classes of the first semester of the third grade and top/bottom quarter classes of the second semester of the fifth grade are in Table 19. Results show that correlation coefficients were positive and significant, favoring experimental classes. Correlations were .1136 for the first semester of the third grade and .1620 for the second semester of the fifth grade.

Table 18

Correlations between Science Achievement and Group for Total Sample

Variable	Totsone	Totstwo	Totsth	Totsfour	Totsfive	Totssix
Group*	.0574c	-.0101	.0223	.0468d	.0022	.0535c

c $p<.01$
d $p<.05$
Totsone :Science achievement of 1st semester of 3rd grade
Totstwo :Science achievement of 2nd semester of 3rd grade
Totsth :Science achievement of 1st semester of 4th grade
Totsfour:Science achievement of 2nd semester of 4th grade
Totsfive:Science achievement of 1st semester of 5th grade
Totssix :Science achievement of 2nd semester of 5th grade
* Experimental classes were coded as one, non-experimental classes were coded as zero. Positive correlations favor the experimental group.

Table 19

Correlations between Group and Top and Bottom Quarter Classes of the First Semester of the Third Grade and the Second Semester of the Fifth Grade

Variable	S1	S6
Group*	.1136a	.1620a

a $p< .0000$
S1: Variable separates top/bottom quarter classes of science achievement of 1st semester of 3rd grade. Top classes were coded as one; bottom classes were codes as zero.
S6: Variable separates top/bottom quarter classes of science achievement of 2nd semester of 5th grade. Top classes were coded as one; bottom classes coded zero.
* Experimental classes were coded as one, non-experimental classes zero.

SECTION THREE: RESULTS OF STEPWISE MULTIPLE REGRESSION ANALYSES

Selection of Variables for Multiple Regression Analyses

There are three groups of selected variables analyzed in this study. They are as follows:

1. student characteristics: (1) student background variables: Student's sex, parental education and occupation; (2) scholastic ability (Chinese and mathematics achievement); and (3) science achievement;
2. teacher characteristics: inservice teacher training (group);
3. school or school districts conditions: school size.

The correlation matrices (Appendix D) showed that the group (Experimental vs Non-experimental group) correlated significantly with Chinese achievement for the first four semesters. However, the highest correlation was -.09 (Non-experimental group higher) and would account for less than one percent of the variance of Chinese achievement. The highest correlations between group and mathematics achievement was -.05 (Non-experimental group higher) which was even smaller than the highest correlation between group and Chinese achievement. Therefore, the variable 'group' was dropped from the analyses of predictors of Chinese and mathematics achievement. Only student background variables and school size were used in the analysis of Chinese and

mathematics achievement. Group was included in the analyses for science achievement.

The sequence of reporting for the regression analyses results is as follows:

1. predictors of Chinese achievement;
2. predictors of mathematics achievement;
3. predictors of science achievement;
4. prediction of science achievement by group.

Predictors of Chinese Achievement

The results for the analyses of each semester of Chinese achievement by student background variables and school size are presented in Tables 20, 21, 22, 23, 24 and 25.

The predictions were very consistent for the six semesters. Student background variables and school size accounted for 13 to 14 percent of the variance in Chinese achievement. Results indicated that students whose parents had more education scored higher than those whose parents had less. The educational level of the father was the strongest predictor.

Sex of the student was the second strongest predictor for all six semesters. The correlation coefficients became more negative from -.1583 to -.1927; girls did better than boys.

The influence of student background variables in Chinese achievement appeared to be relatively constant from grade

three through grade five. The impact of parental education on the pupil's language achievement is clear and similar to results in other studies (Thorndike, 1973; Liu, 1981). The performance of girls is a pattern found in other countries including the United States (Herman, 1975; Walker, 1976; Bank, Briddle, & Good, 1980).

Table 20

Multiple Regression of Student Background Variables and School Size to the First Semester of the Third Grade Chinese Achievement

MULTIPLE R	.36525
R SQUARE	.13341
ADJUSTED R SQUARE	.13028
STANDARD ERROR	14.54674

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	81177.48239	9019.72027
RESIDUAL	2492	527326.29441	211.60766
F = 42.62473		SIGNIF F = .0000	

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2389	.0571	.0567	151.343	.000	.0571
2	SEX	.2838	.0805	.0798	109.438	.000	.0235
3	FJ1	.3181	.1012	.1001	93.759	.000	.0207
4	MED1	.3337	.1114	.1100	78.241	.000	.0102
5	MED3	.3536	.1251	.1233	71.358	.000	.0137
6	FJ2	.3579	.1281	.1260	61.102	.000	.0030
7	FED1	.3610	.1303	.1278	53.374	.000	.0022
8	FED6	.3631	.1318	.1291	47.326	.000	.0016
9	SSIZE	.3652	.1334	.1303	42.625	.000	.0016

FED3:Father's highest education is elementary school.
FJ1 :Father's occupation is farmer.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.
FJ2 :Father's occupation is worker.
FED1:Father has no school education at all.
FED6:Father's highest education is college or higher.
SSIZE:School size

Table 21

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Third Grade Chinese Achievement

MULTIPLE R	.36497		
R SQUARE	.13320		
ADJUSTED R SQUARE	.13007		
STANDARD ERROR	14.60926		

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	81731.28158	9081.25351
RESIDUAL	2492	531868.70860	213.43046
F = 42.54900	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2441	.0596	.0592	158.464	.000	.0596
2	SEX	.2942	.0866	.0858	118.437	.000	.0270
3	FJ1	.3195	.1021	.1010	94.679	.000	.0155
4	MED1	.3354	.1125	.1111	79.133	.000	.0104
5	MED3	.3506	.1229	.1211	69.943	.000	.0104
6	SSIZE	.3553	.1263	.1242	60.089	.000	.0034
7	FJ2	.3591	.1290	.1265	52.758	.000	.0027
8	FED1	.3621	.1311	.1283	47.031	.000	.0022
9	FED4	.3650	.1332	.1301	42.549	.000	.0021

FED3:Father's highest education is elementary school.
FJ1 :Father's occupation is farmer.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.
FJ2 :Father's occupation is worker.
FED1:Father has no school education at all.
FED4:Father's highest education is junior high school.
SSIZE:School size

Table 22

Multiple Regression of Student Background Variables and School Size to the First Semester of the Fourth Grade Chinese Achievement

	MULTIPLE R		.36895
	R SQUARE		.13612
	ADJUSTED R SQUARE		.13335
	STANDARD ERROR		14.66926

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	8	84531.98319	10566.49790
RESIDUAL	2493	536461.44361	215.18710
F = 49.10377	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2425	.0588	.0584	156.140	.000	.0588
2	SEX	.2957	.0874	.0867	119.718	.000	.0287
3	FJ1	.3208	.1029	.1018	95.528	.000	.0155
4	MED1	.3385	.1146	.1132	80.782	.000	.0117
5	MED3	.3540	.1253	.1236	71.534	.000	.0108
6	SSIZE	.3639	.1325	.1304	63.487	.000	.0071
7	FED1	.3667	.1345	.1320	55.349	.000	.0020
8	FED6	.3689	.1361	.1334	49.104	.000	.0017

FED3:Father's highest education is elementary school.
FJ1 :Father's occupation is farmer.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.
FED1:Father has no school education at all.
FED6:Father's highest education is college or higher.
SSIZE:School size

Table 23

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Fourth Grade Chinese Achievement

MULTIPLE R	.37093	
R SQUARE	.13759	
ADJUSTED R SQUARE	.13448	
STANDARD ERROR	14.39566	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	82393.24340	9154.80482
RESIDUAL	2492	516429.89345	207.23511

F = 44.17594 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2409	.0580	.0577	154.013	.000	.0580
2	SEX	.2996	.0897	.0890	123.196	.000	.0317
3	MED1	.3259	.1062	.1051	98.920	.000	.0164
4	MED3	.3450	.1190	.1176	84.320	.000	.0128
5	FJ1	.3580	.1282	.1264	73.392	.000	.0092
6	SSIZE	.3626	.1315	.1294	62.945	.000	.0033
7	FED1	.3663	.1341	.1317	55.196	.000	.0027
8	FED6	.3687	.1360	.1332	49.041	.000	.0018
9	MJ2	.3709	.1376	.1345	44.176	.000	.0016

FED3:Father's highest education is elementary school.
FJ1 :Father's occupation is farmer.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.
FED1:Father has no school education at all.
FED6:Father's highest education is college or higher.
SSIZE:School size
MJ2 :Mother's occupation is worker.

Table 24

Multiple Regression of Student Background Variables and School Size to the First Semester of the Fifth Grade Chinese Achievement

	MULTIPLE R		.37898
	R SQUARE		.14363
	ADJUSTED R SQUARE		.14054
	STANDARD ERROR		14.28078

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	85238.01763	9470.89085
RESIDUAL	2492	508220.04199	203.94063

F = 46.43945 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2345	.0550	.0546	145.450	.000	.0550
2	SEX	.2982	.0889	.0882	121.959	.000	.0339
3	MED1	.3291	.1083	.1073	101.163	.000	.0194
4	FJ1	.3503	.1227	.1213	87.341	.000	.0144
5	MED3	.3656	.1336	.1319	77.004	.000	.0109
6	FED6	.3708	.1375	.1354	66.290	.000	.0039
7	FJ2	.3743	.1401	.1377	58.051	.000	.0026
8	FED1	.3769	.1420	.1393	51.588	.000	.0019
9	SSIZE	.3790	.1436	.1405	46.439	.000	.0016

FED3:Father's highest education is elementary school.
FJ1 :Father's occupation is farmer.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.
FED1:Father has no school education at all.
FED6:Father's highest education is college or higher.
SSIZE:School size
FJ2 :Father's occupation is worker.

Table 25

Multiple Regression of Student Background Variables and School S to the Second Semester of the Fifth Grade Chinese Achievement

MULTIPLE R	.37811
R SQUARE	.14297
ADJUSTED R SQUARE	.14022
STANDARD ERROR	14.01898

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	8	81734.84561	10216.85570
RESIDUAL	2493	489953.80596	196.53181

F = 51.98576 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2404	.0578	.0574	153.344	.000	.0578
2	SEX	.3048	.0929	.0922	128.015	.000	.0351
3	FJ1	.3336	.1113	.1102	104.297	.000	.0184
4	MED1	.3507	.1230	.1216	87.567	.000	.0117
5	MED3	.3650	.1332	.1315	76.716	.000	.0102
6	SSIZE	.3713	.1379	.1358	66.490	.000	.0046
7	FJ2	.3761	.1414	.1390	58.698	.000	.0036
8	FED6	.3781	.1430	.1402	51.986	.000	.0015

FED3:Father's highest education is elementary school.
Father's occupation is farmer.
Mother has no school education at all.
MED3:Mother's highest education is elementary school.
FED6:Father's highest education is college or higher.
SSIZE:School size
FJ2 :Father occupation's is worker.

Predictors of Mathematics Achievement

The analyses for student background variables and school size to mathematics achievement are presented in Tables 26, 27, 28 , 29, 30 and 31.

Student background variables and school size accounted for about 13 to 14 percent of the variance in mathematics achievement. This is very similar to the results for Chinese achievement. Results indicated that students whose parents had more education and professional occupations scored higher than those whose parents had less education and whose parents had non-professional employment. The educational level of the father was again the strongest predictor.

Sex was a predictor on the regression analysis result of the second semester of the fourth grade and showed that girls did little better than boys (r=-.0570). For the other five semesters, sex was not a predictor.

School size appeared on the results of the second semester of the third grade and the first semester of the fourth grade. Both semesters show that students in large size schools did slightly better than students in middle size schools.

Table 26

Multiple Regression of Student Background Variables and School Size to the First Semester of the Third Grade Mathematics Achievement

	MULTIPLE R		.36804
	R SQUARE		.13545
	ADJUSTED R SQUARE		.13198
	STANDARD ERROR		15.76597
	ANALYSIS OF VARIANCE		
	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	97007.43677	9700.74368
RESIDUAL	2491	619177.74675	248.56594
F = 39.02684	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2526	.0638	.0635	170.444	.000	.0638
2	FED1	.3064	.0939	.0932	129.451	.000	.0301
3	FJ1	.3305	.1092	.1082	102.100	.000	.0153
4	FJ2	.3413	.1165	.1151	82.314	.000	.0073
5	FJ7	.3458	.1196	.1178	67.794	.000	.0031
6	FJ10	.3499	.1224	.1203	58.005	.000	.0028
7	MED1	.3538	.1252	.1227	50.984	.000	.0028
8	MED3	.3628	.1316	.1288	47.226	.000	.0064
9	MJ2	.3659	.1339	.1308	42.802	.000	.0023
10	MJ13	.3680	.1355	.1320	39.027	.000	.0016

FED3:Father's highest education is elementary school.
FED1:Father has no school education at all.
FJ1 :Father's occupation is farmer.
FJ2 :Father's occupation is worker.
FJ7 :Father's occupation is transportation (bus driver).
FJ10:Father's occupation is governmental officer.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.
MJ2 :Mother's occupation is worker.
MJ13:Mother's occuparion is housewife.

Table 27

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Third Grade Mathematics Achievement

MULTIPLE R	.36231
R SQUARE	.13127
ADJUSTED R SQUARE	.12813
STANDARD ERROR	16.24151

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	99327.54061	11036.39340
RESIDUAL	2492	657356.51024	263.78672

F = 41.83832 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2621	.0687	.0683	184.398	.000	.0687
2	FED1	.3088	.0954	.0946	131.728	.000	.0267
3	FJ1	.3234	.1046	.1035	97.272	.000	.0092
4	FJ2	.3357	.1127	.1113	79.311	.000	.0081
5	MED1	.3424	.1173	.1155	66.314	.000	.0045
6	MED3	.3546	.1258	.1237	59.821	.000	.0085
7	FJ10	.3572	.1276	.1251	52.108	.000	.0018
8	FJ7	.3600	.1296	.1268	46.398	.000	.0020
9	SSIZE	.3623	.1313	.1281	41.838	.000	.0017

FED3: Father's highest education is elementary school.
FED1: Father has no school education at all.
FJ1 : Father's occupation is farmer.
FJ2 : Father's occupation is worker.
FJ7 : Father's occupation is transportation (bus driver).
FJ10: Father's occupation is governmental officer.
MED1: Mother has no school education at all.
MED3: Mother's highest education is elementary school.
SSIZE: School size

Table 28

Multiple Regression of Student Background Variables and School Size to the First Semester of the Fourth Grade Mathematics Achievement

MULTIPLE R	.37581
R SQUARE	.14123
ADJUSTED R SQUARE	.13744
STANDARD ERROR	17.46843

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	11	124955.95570	11359.63234
RESIDUAL	2490	759813.35878	305.14593

F = 37.22688 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2666	.0711	.0707	191.306	.000	.0711
2	FED1	.3008	.0905	.0898	124.312	.000	.0194
3	FJ1	.3197	.1022	.1011	94.780	.000	.0117
4	FED6	.3316	.1099	.1085	77.096	.000	.0077
5	MED1	.3404	.1159	.1141	65.436	.000	.0060
6	MED3	.3545	.1257	.1236	59.771	.000	.0098
7	SSIZE	.3600	.1296	.1271	53.043	.000	.0039
8	FJ2	.3654	.1335	.1308	48.026	.000	.0039
9	FJ10	.3701	.1370	.1339	43.957	.000	.0035
10	FJ7	.3736	.1396	.1361	40.417	.000	.0026
11	FJ3	.3758	.1412	.1374	37.227	.000	.0016

FED3: Father's highest education is elementary school.
FED1: Father has no school education at all.
FED6: Father's highest education is college or higher.
FJ1 : Father's occupation is farmer.
FJ2 : Father's occupation is worker.
FJ3 : Father's occupation is engineer.
FJ7 : Father's occupation is transportation (bus driver).
FJ10: Father's occupation is governmental officer.
MED1: Mother has no school education at all.
MED3: Mother's highest education is elementary school.
SSIZE: School size

Table 29

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Fourth Grade Mathematics Achievement

MULTIPLE R	.35986
R SQUARE	.12950
ADJUSTED R SQUARE	.12530
STANDARD ERROR	18.29639

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	12	123951.43416	10329.28618
RESIDUAL	2489	833212.63563	334.75799

F = 30.85598 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2572	.0661	.0658	177.070	.000	.0661
2	FED1	.2923	.0855	.0847	116.747	.000	.0193
3	FED6	.3081	.0949	.0938	87.314	.000	.0095
4	FJ4	.3206	.1028	.1013	71.501	.000	.0079
5	FJ9	.3282	.1077	.1059	60.267	.000	.0050
6	MED3	.3346	.1120	.1099	52.441	.000	.0043
7	MED1	.3457	.1195	.1171	48.373	.000	.0076
8	MJ2	.3503	.1227	.1199	43.577	.000	.0031
9	SEX	.3536	.1250	.1219	39.565	.000	.0023
10	MJ13	.3557	.1265	.1230	36.083	.000	.0015
11	FED2	.3578	.1280	.1242	33.229	.000	.0015
12	FJ10	.3599	.1295	.1253	30.856	.000	.0015

FED3:Father's highest education is elementary school.
FED1:Father has no school education at all.
FED2:Father has no school education but can read and write.
FED6:Father's highest education is college or higher.
FJ4 :Father's occupation is businessman.
FJ9 :Father's occupation is teacher.
FJ10:Father's occupation is govenmental officer.
MJ2 :Mother's occupation is worker.
MJ13:Mother's occupation is housewife.
MED1:Mother has no school education at all.
MED3:Mother's highest education is elementary school.

Table 30

Multiple Regression of Student Background Variables and School Size to the First Semester of the Fifth Grade Mathematics Achievement

MULTIPLE R	.35929	
R SQUARE	.12909	
ADJUSTED R SQUARE	.12560	
STANDARD ERROR	19.26853	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	137087.85757	13708.78576
RESIDUAL	2491	924849.18602	371.27627

F = 36.92341 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2503	.0627	.0623	167.159	.000	.0627
2	FED1	.2923	.0855	.0847	116.747	.000	.0193
3	FED6	.3081	.0949	.0938	87.314	.000	.0095
4	FJ4	.3206	.1028	.1013	71.501	.000	.0079
5	FJ9	.3282	.1077	.1059	60.267	.000	.0050
6	MED3	.3346	.1120	.1099	52.441	.000	.0043
7	MED1	.3457	.1195	.1171	48.373	.000	.0076
8	MJ2	.3503	.1227	.1199	43.577	.000	.0031
9	SEX	.3536	.1250	.1219	39.565	.000	.0023
10	MJ13	.3557	.1265	.1230	36.083	.000	.0015

FED3:Father's highest education is elementary school.
FED1:Father has no school education at all.
FJ1 :Father's occupation is farmer.
FJ2 :Father's occupation is worker.
FJ7 :Father's occupation is transportation (bus driver).
MED6:Mother's highest education is college or higher.
MED5:Mother's highest education is senior high school.
MED4:Mother's highest education is junior high school.
MED1:Mother has no school education at all.
MJ4 :Mother's occupation is businesswoman.

Table 31

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Fifth Grade Mathematics Achievement

MULTIPLE R	.36619	
R SQUARE	.13409	
ADJUSTED R SQUARE	.13062	
STANDARD ERROR	19.89429	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	152673.98877	15267.39888
RESIDUAL	2491	985895.35497	395.78296
F = 38.57518	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2470	.0610	.0606	162.376	.000	.0610
2	FED1	.2885	.0833	.0825	113.473	.000	.0223
3	FED6	.3119	.0973	.0962	89.721	.000	.0140
4	FJ1	.3295	.1085	.1071	76.014	.000	.0113
5	MJ4	.3376	.1139	.1122	64.196	.000	.0054
6	MED3	.3433	.1178	.1157	55.545	.000	.0039
7	MED1	.3568	.1273	.1249	51.985	.000	.0095
8	MJ2	.3613	.1305	.1277	46.778	.000	.0032
9	FJ9	.3641	.1326	.1295	42.327	.000	.0021
10	MED6	.3662	.1341	.1306	38.575	.000	.0015

FED3:Father's highest education is elementary school.
FED1:Father has no school education at all.
FED6:Father's highest education is college or higher.
FJ1 :Father's occupation is farmer.
FJ9 :Father's occupation is teacher.
MED3:Mother's highest education is elementary school.
MED1:Mother has no school education at all.
MED6:Mother's highest education is college or higher.
MJ4 :Mother's occupation is businesswoman.
MJ2 :Mother's occupation is worker.

Predictors of Science Achievement

The regression analyses results are presented in sequence as follows:

1. prediction of science achievement by student background variables and school size;
2. prediction of science achievement by student background variables, school s , Chinese achievement and mathematics achievement;
3. prediction of science achievement by student background variables, school size, group, Chinese achievement, mathematics achievement, and previous science test results;
4. summary of multiple regression analysis related to science achievement.

Prediction of Science Achievement by Student Background Variables and School Size

Tables 32, 33, 34, 35, 36, and 37 present the analyses results.

Student background variables and school size accounted for about nine to 13 percent of the variance in science achievement. Results again are similar to those for Chinese and mathematics achievement, though slightly weaker. Results indicated that students whose parents had more education and professional occupations scored higher than those whose parents had less education and non-professional

occupations. The educational level of the father was the strongest predictor, though the level of the mother's education was also a strong predictor. The mother's educational level had more impact on the student's science achievement than on their Chinese and mathematics achievement.

The variable 'sex' accounted for less than one percent of the variance in science achievement. Even though sex did not make much difference, boys did slightly better than girls continuously for six semesters. This result was different than for Chinese or mathematics achievement, subjects in which girls scored higher than boys.

Table 32

Multiple Regression of Student Background Variables and School Size to the First Semester of the Third Grade Science Achievement

MULTIPLE R	.30560
R SQUARE	.09339
ADJUSTED R SQUARE	.08842
STANDARD ERROR	2.99523

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	13	2190.30625	168.48510
RESIDUAL	2370	21262.22674	8.97140

F = 18.78024 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.1871	.0350	.0346	86.449	.000	.0350
2	FJ1	.2162	.0467	.0459	58.356	.000	.0117
3	MED6	.2398	.0575	.0563	48.382	.000	.0108
4	MJ2	.2577	.0664	.0649	42.316	.000	.0089
5	SEX	.2657	.0706	.0686	36.121	.000	.0042
6	MJ5	.2726	.0743	.0720	31.814	.000	.0037
7	FJ5	.2788	.0777	.0750	28.614	.000	.0034
8	MED4	.2845	.0809	.0778	26.142	.000	.0032
9	MED5	.2920	.0853	.0818	24.590	.000	.0043
10	FJ3	.2977	.0887	.0848	23.084	.000	.0034
11	MJ4	.3005	.0903	.0861	21.405	.000	.0016
12	FED6	.3030	.0918	.0872	19.980	.000	.0015
13	SSIZE	.3056	.0934	.0884	18.780	.000	.0016

FED3: Father's highest education is elementary school.
FJ1 : Father's occupation is farmer.
MED6: Mother's highest education is college or higher.
MJ2 : Mother's occupation is worker.
MJ5 : Mother's occupation is fisher.
FJ5 : Father's occupation is fisher.
MED4: Mother's highest education is junior high school.
MED5: Mother's highest education is senior high school.
FJ3 : Father's occupation is engineer.
MJ4 : Mother's occupation is businesswoman.
FED6: Father's highest education is college or higher.
SSIZE: School size

Table 33

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Third Grade Science Achievement

MULTIPLE R		.31771
R SQUARE		.10094
ADJUSTED R SQUARE		.09677
STANDARD ERROR		3.53089

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	3017.90404	301.79040
RESIDUAL	2156	26879.29890	12.46721
F = 24.20674	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.1915	.0367	.0362	82.378	.000	.0367
2	SSIZE	.2217	.0492	.0483	55.956	.000	.0125
3	FED6	.2441	.0596	.0583	45.681	.000	.0104
4	MJ2	.2575	.0663	.0646	38.376	.000	.0067
5	SEX	.2688	.0722	.0701	33.658	.000	.0060
6	MJ5	.2792	.0780	.0754	30.447	.000	.0057
7	FJ5	.2942	.0866	.0836	29.224	.000	.0086
8	MED4	.3040	.0924	.0891	27.471	.000	.0059
9	MED5	.3109	.0967	.0929	25.653	.000	.0043
10	FED4	.3177	.1009	.0968	24.207	.000	.0043

FED3:Father's highest education is elementary school.
SSIZE:School size
FED6:Father's highest education is college or higher.
MJ2 :Mother's occupation is worker.
MJ5 :Mother's occupation is fisher.
FJ5 :Father's occupation is fisher.
MED4:Mother's highest education is junior high school.
FED5:Father's highest education is senior high school.
FED4:Father's highest education is junior high school.
FJ4 :Father's occupation is businessman.
MED6:Mother's highest education is college or higher.
MED5:Mother's highest education is senior high school.
MED3:Mother's highest education is elementary school.

Table 34

Multiple Regression of Student Background Variables and School Size to the First Semester of the Fourth Grade Science Achievement

MULTIPLE R		.35529
R SQUARE		.12623
ADJUSTED R SQUARE		.12152
STANDARD ERROR		3.90486

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	4079.71840	407.97184
RESIDUAL	1852	28239.10909	15.24790

F = 20.20302 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2842	.0616	.0611	122.156	.000	.0616
2	MED6	.2910	.0847	.0837	86.064	.000	.0231
3	FJ5	.3047	.0928	.0914	63.399	.000	.0081
4	SSIZE	.3186	.1015	.0996	52.476	.000	.0087
5	MED1	.3305	.1092	.1068	45.551	.000	.0077
6	MJ2	.3376	.1140	.1111	39.785	.000	.0047
7	MED5	.3429	.1176	.1143	35.315	.000	.0036
8	MJ5	.3480	.1211	.1173	31.927	.000	.0035
9	FJ4	.3521	.1240	.1197	29.133	.000	.0029
10	SEX	.3553	.1262	.1215	26.756	.000	.0023

FED3:Father's highest education is elementary school.
MED3:Mother's highest education is elementary school.
FJ5 :Father's occupation is fisher.
SSIZE:School size
MED1:Mother has no school education at all.
MJ2 :Mother's occupation is worker.
MED5:Mother's highest education is senior high school.
MJ5 :Mother's occupation is fisher.
FJ4 :Father's occupation is businessman.

Table 35

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Fourth Grade Science Achievement

MULTIPLE R	.32784	
R SQUARE	.10748	
ADJUSTED R SQUARE	.10311	
STANDARD ERROR	3.62387	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	12	3877.67431	323.13953
RESIDUAL	2452	32200.69747	13.13242
F = 24.60624	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED6	.1894	.0359	.0355	91.632	.000	.0359
2	FED5	.2290	.0524	.0517	68.134	.000	.0166
3	MJ2	.2549	.0650	.0639	57.027	.000	.0126
4	SEX	.2746	.0754	.0739	50.142	.000	.0104
5	FED4	.2913	.0849	.0830	45.608	.000	.0095
6	MED6	.3014	.0909	.0887	40.948	.000	.0060
7	FJ4	.3091	.0955	.0929	37.070	.000	.0047
8	MED5	.3151	.0993	.0964	33.845	.000	.0038
9	FJ9	.3196	.1021	.0988	31.027	.000	.0028
10	FED1	.3230	.1043	.1007	28.583	.000	.0022
11	FJ3	.3253	.1058	.1018	26.394	.000	.0015
12	SSIZE	.3278	.1075	.1031	24.606	.000	.0016

FED6:Father's highest education is college or higher.
FED5:Father's highest education is senior high school.
MJ2 :Mother's occupation is worker.
FED4:Father's highest education is junior high school.
MED6:Mother's highest education is college or higher.
FJ4 :Father's occupation is businessman.
MED5:Mother's highest education is senior high school.
FJ9 :Father's occupation is teacher.
FED1:Father has no school education at all.
FJ3 :Father's occupation is engineer.
SSIZE:School size

Table 36

Multiple Regression of Student Background Variables and School Size to the First Semester of the Fifth Grade Science Achievement

MULTIPLE R	.30707	
R SQUARE	.09429	
ADJUSTED R SQUARE	.09101	
STANDARD ERROR	3.83793	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	3806.08794	422.89866
RESIDUAL	2482	36559.07291	14.72968

F = 28.71064 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2025	.0410	.0406	106.439	.000	.0410
2	FED1	.2344	.0549	.0542	72.332	.000	.0139
3	MED6	.2566	.0658	.0647	58.443	.000	.0109
4	SSIZE	.2674	.0715	.0700	47.869	.000	.0057
5	SEX	.2772	.0768	.0750	41.377	.000	.0053
6	MED3	.2863	.0820	.0797	36.973	.000	.0051
7	FJ1	.2949	.0869	.0844	33.791	.000	.0050
8	MJ2	.3026	.0916	.0887	31.294	.000	.0046
9	MED1	.3071	.0943	.0910	28.711	.000	.0027

FED3:Father's highest education is elementary school.
FED1:Father has no school education at all.
MED6:Mother's highest education is college or higher.
SSIZE:School size
MED3:Mother's highest education is elementary school.
FJ1 :Father's occupation is farmer.
MJ2 :Mother's occupation is worker.
MED1:Mother has no school education at all.

Table 37

Multiple Regression of Student Background Variables and School Size to the Second Semester of the Fifth Grade Science Achievement

MULTIPLE R	.33012	
R SQUARE	.10898	
ADJUSTED R SQUARE	.10576	
STANDARD ERROR	3.96630	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	4794.89935	532.76659
RESIDUAL	2492	39203.01044	15.73155
F = 33.86613	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FED3	.2109	.0445	.0441	116.405	.000	.0445
2	MED6	.2567	.0659	.0651	88.134	.000	.0214
3	MJ2	.2785	.0776	.0765	70.016	.000	.0117
4	FED1	.2951	.0871	.0856	59.561	.000	.0095
5	MED5	.3067	.0941	.0922	51.825	.000	.0069
6	MED4	.3163	.1001	.0979	46.233	.000	.0060
7	SSIZE	.3229	.1043	.1018	41.473	.000	.0042
8	FJ4	.3268	.1068	.1039	37.257	.000	.0025
9	SEX	.3301	.1090	.1058	33.866	.000	.0022

FED3:Father's highest education is elementary school.
MED6:Mother's highest education is college or higher.
MJ2 :Mother's occupation is worker.
FED1:Father has no school education at all.
MED5:Mother's highest education is senior high school.
MED4:Mother's highest education is junior high school.
SSIZE:School size
FJ4 :Father's occupation is businessman.

Prediction of Science Achievement by Student Background Variables, School Size, Chinese Achievement and Mathematics Achievement

Tables 38, 39, 40, 41, 42, and 43 present the regression results.

Student background variables, school size, Chinese and mathematics achievement accounted for 28 to about 42 percent of the variance in science achievement. Adding student ability in language and mathematics accounted for about 19 to 30 percent more of the variance.

Mathematics achievement was the best predictor of science achievement consistently for all six semesters. Mathematics achievement accounted for about 24 to 39 percent of the variance in science achievement. Most students who did well in mathematics also did well in science. Other predictors did not contribute much to the variance.

Table 38

Multiple Regression of Student Background Variables, School Size, Chinese and Mathematics Achievement to the First Semester of the Third Grade Science Achievement

	MULTIPLE R	.56008	
	R SQUARE	.31369	
	ADJUSTED R SQUARE	.31079	
	STANDARD ERROR	2.60440	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	7356.74545	735.67454
RESIDUAL	2373	16095.78754	6.78289
F =108.46041	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M1	.5258	.2765	.2762	910.405	.000	.2765
2	MJ5	.5329	.2840	.2834	472.232	.000	.0075
3	SEX	.5385	.2900	.2891	323.980	.000	.0060
4	MED6	.5437	.2956	.2944	249.539	.000	.0056
5	C1	.5484	.3007	.2992	204.499	.000	.0051
6	MJ2	.5522	.3049	.3031	173.761	.000	.0042
7	FJ5	.5554	.3085	.3065	151.426	.000	.0036
8	MJ1	.5571	.3104	.3080	133.597	.000	.0019
9	FJ3	.5586	.3120	.3094	119.639	.000	.0017
10	MED3	.5601	.3137	.3108	108.460	.000	.0017

M1:Math. score of the first semester of the third grade
MJ5::Mother's occupation is fisher.
MED6:Mother's highest education is college or higher.
C1:Chinese score of the first semester of the third grade
MJ2:Mother's occupation is worker.
FJ5 :Father's occupation is fisher.
MJ1 :Mother's occupation is farmer.
FJ3:Father's occupation is engineer.
MED3:Mother's highest education is elementary school.

Table 39

Multiple Regression of Student Background Variables, School Size, Chinese Achievement and Mathematics Achievement to the Second Semester of the Third Grade Science Achievement

MULTIPLE R	.52993
R SQUARE	.28082
ADJUSTED R SQUARE	.27782
STANDARD ERROR	3.15725

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	8395.79921	932.86658
RESIDUAL	2157	21501.40372	9.96820
F = 93.58427	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M2	.4850	.2352	.2349	665.988	.000	.2352
2	MJ5	.4991	.2491	.2484	359.001	.000	.0139
3	SEX	.5080	.2581	.2570	250.789	.000	.0089
4	FED6	.5129	.2631	.2617	192.979	.000	.0050
5	MJ2	.5172	.2675	.2658	157.798	.000	.0044
6	FJ5	.5208	.2713	.2692	134.004	.000	.0038
7	SSIZE	.5257	.2764	.2740	117.807	.000	.0051
8	C2	.5279	.2787	.2760	104.229	.000	.0023
9	MED4	.5299	.2808	.2778	93.584	.000	.0021

M2:Math. score of the second semester of the third grade
MJ5::Mother's occupation is fisher.
FED6:Father's highest education is college or higher.
MJ2:Mother's occupation is worker.
FJ5 :Father's occupation is fisher.
SSIZE:School size
C2:Chinese score of the second semester of the third grade
MED4:Mother's highest education is junior high school.

Table 40

Multiple Regression of Student Background Variables, School Size, Chinese Achievement and Mathematics Achievement to the First Semester of the Fourth Grade Science Achievement

MULTIPLE R	.63366	
R SQUARE	.40153	
ADJUSTED R SQUARE	.39830	
STANDARD ERROR	3.23169	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	12976.91077	1297.69108
RESIDUAL	1852	19341.91671	10.44380
F =124.25469	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M3	.5980	.3577	.3573	1036.204	.000	.3577
2	MED6	.6085	.3702	.3696	546.743	.000	.0126
3	FED3	.6131	.3759	.3749	373.283	.000	.0057
4	FJ5	.6186	.3826	.3813	287.903	.000	.0067
5	MJ5	.6215	.3863	.3846	233.779	.000	.0037
6	SEX	.6244	.3899	.3879	197.662	.000	.0036
7	C3	.6279	.3942	.3920	172.468	.000	.0044
8	MED4	.6303	.3973	.3947	152.773	.000	.0031
9	MJ2	.6320	.3995	.3966	136.966	.000	.0022
10	FED4	.6337	.4015	.3983	124.255	.000	.0020

M3:Math. score of the first semester of the fourth grade
MED6:Mother's highest education is college/university.
FED3:Father's highest education is elementary school.
FJ5:Father's occupation is fisher.
MJ5 :Mother's occupation is fisher.
C3:Chinese score of the first semester of the fourth grade
MED4:Mother's highest education is junior high school.
MJ2::Mother's occupation is worker.
FED4:Father's highest education is junior high school.

Table 41

Multiple Regression of Student Background Variables, School Size, Chinese Achievement and Mathematics Achievement to the Second Semester of the Fourth Grade Science Achievement

MULTIPLE R	.61843		
R SQUARE	.38245		
ADJUSTED R SQUARE	.38094		
STANDARD ERROR	3.01070		

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	6	13798.25048	2299.70841
RESIDUAL	2458	22280.12129	9.06433
F =253.70972	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M4	.5906	.3488	.3485	1319.152	.000	.3488
2	SEX	.6055	.3666	.3661	712.456	.000	.0178
3	MED6	.6118	.3742	.3735	490.625	.000	.0077
4	MJ2	.6155	.3788	.3778	374.987	.000	.0045
5	MED5	.6176	.3815	.3802	303.308	.000	.0027
6	MJ5	.6184	.3825	.3809	253.710	.000	.0010

M4:Math. score of the second semester of the third grade
MED6:Mother's highest education is college or higher.
MJ2:Mother's occupation is worker.
MED5:Mother's highest education is senior high school.
MJ5 :Mother's occupation is fisher.

Table 42

Multiple Regression of Student Background Variables, School Size, Chinese Achievement and Mathematics Achievement to the First Semester of the Fifth Grade Science Achievement

MULTIPLE R	.60588
R SQUARE	.36709
ADJUSTED R SQUARE	.36479
STANDARD ERROR	3.20829

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	14817.58718	1646.39858
RESIDUAL	2482	25547.57367	10.29314

F =159.95105 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M5	.5798	.3362	.3359	1261.002	.000	.3362
2	SEX	.5868	.3443	.3438	653.458	.000	.0081
3	C5	.5922	.3507	.3499	447.933	.000	.0064
4	SSIZE	.5960	.3553	.3542	342.611	.000	.0046
5	MED3	.6001	.3601	.3588	279.812	.000	.0048
6	MED6	.6022	.3626	.3611	235.630	.000	.0025
7	MJ2	.6039	.3647	.3629	203.684	.000	.0020
8	FED4	.6051	.3661	.3640	179.246	.000	.0014
9	FED1	.6059	.3671	.3648	159.951	.000	.0010

M5:Math. score of the first semester of the fifth grade
C5:Chinese score of the first semester of the fifth grade
SSIZE:School size
MED3:Mother's highest education is elementary school.
MED6:Mother's highest education is college or higher.
MJ2 :Mother's occupation is worker.
FED4:Father's highest education is junior high school.
FED1:Father has no school education at all.

Table 43

Multiple Regression of Student Background Variables, School Size, Chinese Achievement and Mathematics Achievement to the Second Semester of the Fifth Grade Science Achievement

MULTIPLE R	.64489
R SQUARE	.41589
ADJUSTED R SQUARE	.41401
STANDARD ERROR	3.21073

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	8	18298.15356	2287.26919
RESIDUAL	2493	25699.75622	10.30877
F =221.87612		SIGNIF F = .0000	

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M6	.6213	.3860	.3858	1571.694	.000	.3860
2	MED6	.6275	.3937	.3932	811.462	.000	.0077
3	MJ2	.6314	.3986	.3979	551.909	.000	.0049
4	SEX	.6347	.4028	.4019	421.071	.000	.0042
5	C6	.6384	.4076	.4064	343.425	.000	.0048
6	SSIZE	.6422	.4125	.4111	291.944	.000	.0049
7	MED3	.6441	.4148	.4132	252.548	.000	.0023
8	FED5	.6449	.4159	.4140	221.876	.000	.0011

M6 :Math. score of the second semester of the fifth grade
MED6:Mother's highest education is college or higher.
MJ2 :Mother's occupation is worker.
C6 :Chinese score of the second semester of the fifth grade
SSIZE:School size
MED3:Mother's highest education is elementary school.
FED5:Father's highest education is senior high school.

Prediction of Science Achievement by Student Background Variables, School Size, Chinese Achievement, Mathematics Achievement and Previous Science Achievement

Since the first semester of the third grade had no previous science achievement, no analysis is presented for it. Tables 44, 45, 46, 47, and 48 present the analyses of other five semesters. All variables accounted for about 38 percent (the second semester of the third grade) to 58 percent (the second semester of the fifth grade) of the variance in science achievement. Compared to the previous analyses, the explained variance increased from 10 to 16 percent.

Results showed that previous science achievement was the strongest predictor of current science achievement four out of five semesters. Previous science achievement explained 30 to 45 percent of the variance. The impact of previous instruction in science for the sample was very significant. The second strongest predictor was the same semester's mathematics achievement. It accounted for about six to ten percent of the variance in science achievement.

The result of the first semester of the fourth grade is the only exception that the mathematics achievement was the strongest predictor.

The rest of the predictors accounted for a small amount of the variance. The sequence of variables for each semester did not show a consistent pattern. Group only appeared in two of these analyses and was not strong.

The results show that students who achieved in science and mathematics at lower grades also achieved in science later.

Table 44

Multiple Regression of Student Background Variables, School Size, Chinese Achievement, Mathematics Achievement and Previous Science Achievement to the Second Semester of the Third Grade Science Achievement

	MULTIPLE R	.61478	
	R SQUARE	.37795	
	ADJUSTED R SQUARE	.37536	
	STANDARD ERROR	2.93631	

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	11299.78520	1255.53169
RESIDUAL	2157	18597.41773	8.62189
F =145.62139		SIGNIF F = .0000	

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	TOTSONE	.5447	.2966	.2963	913.122	.000	.2966
2	M2	.5957	.3548	.3542	595.038	.000	.0582
3	MJ5	.6021	.3625	.3616	409.939	.000	.0077
4	SEX	.6055	.3667	.3655	312.907	.000	.0042
5	SSIZE	.6083	.3701	.3686	253.925	.000	.0034
6	FED6	.6103	.3724	.3707	213.630	.000	.0023
7	FJ5	.6124	.3751	.3731	185.130	.000	.0027
8	FED5	.6139	.3768	.3745	163.117	.000	.0017
9	MJ2	.6148	.3780	.3754	145.621	.000	.0011

TOTSONE:Science score of the 1st semester of grade three
M2 :Mathematics score of the 2nd semester of grade three
MJ5:Mother's occupation is fisher.
SSIZE:School size
FED6:Father's highest education is college or higher.
FJ5 :Father's occupation is fisher.
FED5:Father's highest education is senior high school.
MJ2 :Mother's occupation is worker.

Table 45

Multiple Regression of Student Background Variables, School Size, Chinese Achievement, Mathematics Achievement, and Previous Science Achievement to the First Semester of the Fourth Grade Science Achievement

MULTIPLE R	.72091
R SQUARE	.51971
ADJUSTED R SQUARE	.51707
STANDARD ERROR	2.89520

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	16534.76713	1653.47671
RESIDUAL	1823	15280.70590	8.38218
F =197.26105	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M3	.5980	.3577	.3573	1020.057	.000	.3577
2	TOTSONE	.6750	.4556	.4550	766.048	.000	.0979
3	TOTSTWO	.7038	.4953	.4945	598.698	.000	.0398
4	MED6	.7086	.5021	.5010	461.138	.000	.0068
5	FED4	.7118	.5067	.5054	375.532	.000	.0046
6	MED4	.7149	.5110	.5094	318.246	.000	.0043
7	FJ5	.7173	.5146	.5127	276.524	.000	.0035
8	FED3	.7189	.5168	.5147	243.996	.000	.0022
9	C3	.7199	.5183	.5159	218.080	.000	.0015
10	MJ1	.7209	.5197	.5171	197.261	.000	.0014

M3:Math. score of the 1st semester of the 3rd grade
TOTSONE:Science score of the 1st semester of the 3rd grade
TOTSTWO:Science score of the 2nd semester of the 3rd grade
MED6:Mother's highest education is college or higher.
FED4:Father's highest education is junior high school.
MED4:Mother's highest education is junior high school.
FJ5 :Father's occupation is fisher.
FED3:Father's highest education is elementary school.
C3:Chinese score of the 1st semester of the 4th grade
MJ1:Mother's occupation is farmer.

Table 46

Multiple Regression of Student Background Variables, School Size, Chinese Achievement, Mathematics Achievement, and Previous Science Achievement to the Second Semester of the Fourth Grade Science Achievement

MULTIPLE R	.74113
R SQUARE	.54927
ADJUSTED R SQUARE	.54655
STANDARD ERROR	2.57672

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	11	14742.03058	1340.18460
RESIDUAL	1822	12097.11530	6.63947

F =201.85113 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	TOTSTH	.6714	.4508	.4505	1503.612	.000	.4508
2	M4	.7124	.5076	.5070	943.645	.000	.0568
3	TOTSTWO	.7249	.5255	.5247	675.562	.000	.0179
4	TOTSONE	.7303	.5334	.5324	522.684	.000	.0079
5	SEX	.7350	.5402	.5390	429.563	.000	.0068
6	GROUP	.7363	.5421	.5406	360.529	.000	.0019
7	FJ5	.7375	.5439	.5421	311.045	.000	.0018
8	MJ2	.7386	.5455	.5435	273.820	.000	.0016
9	MJ13	.7398	.5473	.5450	244.974	.000	.0017
10	FED4	.7404	.5483	.5458	221.247	.000	.0010
11	FED1	.7411	.5493	.5466	201.851	.000	.0010

TOTSTH:Science score of the 1st semester of the 4th grade
M4 :Mathematics score of the 2nd semester of the 4th grade
TOTSTWO:Science score of the 2nd semester of the 3rd grade
TOTSONE:Science score of the 1st semester of the 3rd grade
GROUP:Experimental vs non-experimental group
FJ5 :Father's occupation is fisher.
MJ2:Mother's occupation is worker.
MJ13:Mother's occupation is housewife.
FED4:Father's highest education is junior high school.
FED1:Father has no school education at all.

Table 47

Multiple Regression of Student Background Variables, School Size, Chinese Achievement, Mathematics Achievement and Previous Science Achievement to the First Semester of the Fifth Grade Science Achievement

MULTIPLE R	.69533
R SQUARE	.48348
ADJUSTED R SQUARE	.48093
STANDARD ERROR	2.90021

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	9	14360.57428	1595.61936
RESIDUAL	1824	15342.09125	8.41123

F =189.70098 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	TOTSTH	.5851	.3423	.3420	953.646	.000	.3423
2	M5	.6614	.4374	.4368	711.813	.000	.0951
3	TOTSFOUR	.6762	.4573	.4564	513.950	.000	.0199
4	SSIZE	.6827	.4661	.4649	399.140	.000	.0088
5	TOTSTWO	.6887	.4743	.4729	329.851	.000	.0082
6	MED3	.6905	.4768	.4751	277.493	.000	.0025
7	C5	.6921	.4789	.4769	239.772	.000	.0021
8	SEX	.6944	.4821	.4799	212.380	.000	.0032
9	FED1	.6953	.4835	.4809	189.701	.000	.0013

TOTSTH:Science score of the 1st semester of the 4th grade
M5 :Mathematics score of the 1st semester of the 5th grade
TOTSFOUR:Science score of the 2nd semester of the 4th grade
SSIZE:School size
TOTSTWO:Science score of the 2nd semester of the 3rd grade
MED3:Mother's highest education is elementary school.
C5:Chinese score of the 1st semester of the 5th grade
FED1:Father has no school education at all.

Table 48

Multiple Regression of Student Background Variables, School Size, Chinese Achievement, Mathematics Achievement, and Previous Science Achievement to the Second Semester of the Fifth Grade Science Achievement

MULTIPLE R	.76091
R SQUARE	.57899
ADJUSTED R SQUARE	.57668
STANDARD ERROR	2.72894

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	10	18670.25517	1867.02552
RESIDUAL	1823	13576.11373	7.44713
F =250.70411	SIGNIF F = .0000		

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	TOTSFIVE	.6579	.4328	.4325	1397.894	.000	.4328
2	M6	.7228	.5224	.5219	1001.478	.000	.0896
3	TOTSTH	.7423	.5510	.5503	718.656	.000	.0286
4	TOTSTWO	.7510	.5640	.5630	591.431	.000	.0129
5	SSIZE	.7536	.5679	.5667	480.481	.000	.0039
6	TOTSFOUR	.7562	.5719	.5705	406.796	.000	.0040
7	GROUP	.7583	.5750	.5735	352.885	.000	.0031
8	MED6	.7594	.5766	.5748	310.723	.000	.0017
9	MJ2	.7602	.5778	.5758	277.400	.000	.0012
10	C6	.7609	.5790	.5767	250.704	.000	.0012

TOTSFIVE:Science score of the 1st semester of the 5th grade
M6 :Mathematics score of the 2nd semester of the 5th grade
TOTSTH:Science score of the 1st semester of the 4th grade
TOTSTWO:Science score of the 2nd semester of the 3rd grade
SSIZE:School size
TOTSFOUR:Science score of the 2nd semester of the 4th grade
GROUP:Experimental vs non-experimental group
MED6:Mother's highest education is college or higher.
MJ2:Mother's occupation is worker.
C6:Chinese score of the 2nd semester of the 5th grade.

Summary of Multiple Regression Analyses related to Science Achievement

When student background variables and school size were independent variables, father's education and mother's education were always the strong predictors of science achievement. Students whose parents had non-professional occupations had lower science achievement than students whose parents had professional occupations. Six semesters' results showed that parental education had stronger impact on students' science achievement than parental occupations when the grade level increased. Student background variables and school size accounted for nine to 12 percent of the variance (Table 32-37).

When Chinese and mathematics were included in the analyses, mathematics was always the strongest predictor and increased the variance in science achievement from 19 to 29 percent, which increased as the grade level increased. Chinese achievement had moderate correlation with science achievement (r=.41 to r=.51). But, Chinese had higher correlation coefficients with mathematics achievement (r=.67 to r=.79). When multiple regression analyses were run, the mathematics achievement became the strong predictor and Chinese did not add much to the explained variance.

When previous science achievement was included in the analyses, the amount of explained variance increased again.

The science achievement of the previous semester was the strongest predictor for four out of five semesters. It added ten to 16 percent of the variance. Results indicated that previous learning significantly added to the family background and language and mathematics ability.

The variable 'sex' was always statistically significantly correlated to science achievement. However, the correlation coefficients were low (r=.04 to r=.12). The variance of science achievement explained by sex was below one percent. Boys always did statistically significantly better than girls.

Large-size-school students showed statistically better than middle-size-school students in science achievement in grade three and four. In the grade five, students in middle size schools showed statistically better than students in large size schools. However, the correlation coefficients were low (r=.0730 to r=.1320 for grade three and four; r=-.0474 and r=-.0314 for grade five).

The variable 'group' was a predictor on the results of the analyses of the second semester of the fourth and fifth grade. The correlation coefficients were .0468 and .0535 respectively. Detailed analyses of group impacts will be discussed later.

Prediction of Science Achievement by Group

Regression of Student Background Variables, School Size, Chinese and Mathematics Achievement against Science Achievement for Top and Bottom Quarter Classes of the First Semester of the Third Grade

Table 49 shows that the father's occupation categorized as farmer was the strongest predictor to explain the top from the bottom quarter classes of the science achievement of the first semester of the third grade. It accounted for about seven percent of the variance. The negative correlation means that there were more students with low scores whose fathers were farmers than there were with high scores. Mathematics was the second predictor and accounted for about four percent of the variance. Student achievement in large size schools, other parental occupations, and group followed. Group accounted for about one percent of the variance in the science achievement.

Table 49

Multiple Regression of Student Background Variables, Group, School Size, Chinese and Mathematics Achievement to Top and Bottom Quarter Classes of the First Semester of the Third Grade Science Achievement

MULTIPLE R	.46277
R SQUARE	.21416
ADJUSTED R SQUARE	.20690
STANDARD ERROR	.44544

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	11	64.34671	5.84970
RESIDUAL	1190	236.11340	.19841

F = 29.48221 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	FJ1	.2727	.0744	.0736	96.408	.000	.0744
2	M1	.3340	.1116	.1101	75.297	.000	.0372
3	SSIZE	.3743	.1401	.1380	65.071	.000	.0285
4	MJ5	.3908	.1527	.1499	53.928	.000	.0126
5	FJ5	.4103	.1684	.1649	48.434	.000	.0157
6	GROUP	.4239	.1797	.1755	43.619	.000	.0113
7	MED6	.4364	.1905	.1857	40.134	.000	.0108
8	FJ3	.4486	.2012	.1959	37.573	.000	.0108
9	MED5	.4569	.2087	.2028	34.941	.000	.0075
10	FJ4	.4599	.2115	.2049	31.949	.000	.0028
11	FED1	.4628	.2142	.2069	29.482	.000	.0026

FJ1:Father's occupation is farmer.
M1 :Mathematics score of the 1st semester of the 3rd grade
SSIZE:School size
MJ5:Mother's occupation is fisher.
FJ5:Father's occupation is fisher.
Group:Experimental and non-experimental group
MED6:Mother's highest education is college or higher.
FJ3:Father's occupation is engineer.
MED5:Mother's highest education is senior high school.
FJ4:Father's occupation is businessman.
FED1:Father has no school education at all.

Regression of Science Achievement for Top and Bottom Classes of the Second Semester of the Fifth Grade not including Previous Science Achievement

Table 50 shows the result of multiple regression of the second semester of the fifth grade for top and bottom quarter classes on student background variables, school size, Chinese and mathematics achievement.

Results indicate that mathematics achievement was the strongest predictor of the top and bottom quarter classes of the fifth grade science achievement. Mathematics accounted for about four percent of the variance; students in the top quarter classes were better in mathematics than the students were in the bottom classes.

Group was the second strongest predictor and accounted for about three percent of the variance. The positive correlation showed that there were more experimental classes in the top quarter classes than in the bottom quarter classes.

Parent's occupation and mother's education followed as predictors. The explained variance ranged from one to two percent for each variable.

Over all, the student's scholastic ability became a strong predictor of a student being in the top quarter classes or bottom quarter classes. Parent's occupation had less impact on students science achievement when the grade

level increased. However, Group increased its impact on achievement when science achievement was not used as a predictor variable.

Table 50

Multiple Regression of Student Background Variables, Group, School Size, Chinese and Mathematics Achievement for the Top and Bottom Quarter Classes of the Second Semester of the Fifth Grade Science Achievement

MULTIPLE R	.42788
R SQUARE	.18308
ADJUSTED R SQUARE	.17376
STANDARD ERROR	.45080

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	14	55.88404	3.99172
RESIDUAL	1227	249.35302	.20322

F = 19.64218 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	M4	.2068	.0428	.0420	55.419	.000	.0428
2	GROUP	.2684	.0720	.0705	48.077	.000	.0292
3	FJ5	.3030	.0918	.0896	41.730	.000	.0198
4	MJ5	.3343	.1118	.1089	38.914	.000	.0199
5	MED6	.3552	.1262	.1227	35.702	.000	.0144
6	MED5	.3699	.1368	.1326	32.620	.000	.0106
7	C2	.3819	.1458	.1410	30.095	.000	.0090
8	C4	.3951	.1561	.1506	28.512	.000	.0103
9	FJ3	.4029	.1623	.1562	26.528	.000	.0062
10	C6	.4089	.1672	.1604	24.712	.000	.0049
11	C1	.4149	.1721	.1647	23.250	.000	.0050
12	FJ9	.4196	.1761	.1680	21.887	.000	.0039
13	MJ13	.4243	.1800	.1713	20.739	.000	.0039
14	MJ1	.4279	.1831	.1738	19.642	.000	.0031

M4:Mathematics achievemetn of the 2nd semester of 4th grade
Group:Experimental and non-experimental group
FJ5:Father's occupation is fisher.
MJ5:Mother's occupation is fisher.
MED6:Mother's highest education is college or higher.
MED5:Mother's highest education is senior high school.
C2:Chinese achievement of the 2nd semester of the 3rd grade
C4:Chinese achievement of the 2nd semester of the 4th grade
FJ3:Father's occupation is engineer.
C6:Chinese achievement of the 2nd semester of the 6th grade
C1:Chinese achievement of the 1st semester of the 3rd grade
FJ9:Father's occupation is teacher.
MJ13:Mother's occupation is housewife.
MJ1:Mother's occupation is farmer.

Regression of Science Achievement for Top and Bottom Classes of the Second Semester of the Fifth Grade including Previous Science Achievement

Table 51 shows the :ult of regression of science achievement for the top and bottom classes of the second semester of the fifth grade on student background variables, school size, Chinese achievement, mathematics achievement and previous science achievement. The strongest predictor was previous science achievement variable and accounted for about 19 percent of the variance. The second predictor was also a previous science achievement variable. A mathematics variable was the third predictor and accounted for about four percent of the variance. Group was the fourth predictor and accounted for about two percent of the variance. Family background variables, a mathematics variable, and two other science achievement variables followed.

The data indicated science background (previous achievement) and scholastic ability in mathematics were the strongest predictors. Group was not a major predictor. However, since previous science achievement may be related to differential instruction, group may have had more influence than indicated.

Table 51

Multiple Regression of Student Background Variables, School Size, Group, Chinese, Mathematics, and Previous Science Achievement for the Top and Bottom Quarter Classes of the Second Semester of the Fifth Grade Science Achievement

MULTIPLE R	.60712
R SQUARE	.36859
ADJUSTED R SQUARE	.36019
STANDARD ERROR	.39670

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	13	89.75170	6.90398
RESIDUAL	977	153.74926	.15737

F = 43.87133 SIGNIF F = .0000

Variables in the Equation

STEP	VARIABLE	MULTR	RSQ	ADJRSQ	F(EQN)	SIGF	RSQCH
1	TOTSFIVE	.4312	.1859	.1851	225.909	.000	.1859
2	TOTSTWO	.4794	.2298	.2283	147.412	.000	.0439
3	M6	.5163	.2666	.2644	119.591	.000	.0368
4	GROUP	.5394	.2910	.2881	101.158	.000	.0244
5	TOTSTH	.5546	.3075	.3040	87.491	.000	.0166
6	FJ5	.5660	.3204	.3162	77.310	.000	.0128
7	MJ5	.5759	.3316	.3269	69.676	.000	.0112
8	M2	.5826	.3394	.3340	63.066	.000	.0078
9	TOTSONE	.5888	.3467	.3407	57.846	.000	.0073
10	MED5	.5943	.3532	466	53.521	.000	.0065
11	MED6	.6001	.3601	.3529	50.080	.000	.0069
12	SEX	.6037	.3645	.3567	46.738	.000	.0044
13	C2	.6071	.3686	.3602	43.871	.000	.0041

TOTSFIVE: Science score of the 1st semester of the 5th grade
TOTSTWO: Science score of the 2nd semester of the 3rd grade
M6: Mathematics score of the 2nd semester of the 5th grade
GROUP: Experimental and non-experimental group
TOTSTH: Science score of the 1st semester of the 4th grade
FJ5: Father's occupation is fisher.
MJ5: Mother's occupation is fisher.
M2: Mathematics score of the 2nd semester of the 3rd grade
TOTSONE: Science score of the 1st semester of the 3rd grade
MED5: Mother's highest education is senior high school.
MED6: Mother's highest education is college or higher.
C2: Chinese score of the 2nd semester of the 3rd grade

SECTION FOUR:TESTING OF HYPOTHESES

This section presents the testing of the hypotheses stated in Chapter one.:

Hypothesis One: The best regression equation for grade three science achievement will include scholastic ability (Chinese and mathematics achievement), father's education, and inservice teacher education (group) as the most significant predictors (.05 level).

Hypothesis one is not accepted.

Scholastic ability and father's education were significant predictors ($P<.000$). Inservice teacher education (group) was not.

Hypothesis Two: The best regression equation for grade four science achievement will include previous science scores, scholastic ability (Chinese and mathematics achievement), father's education, and inservice teacher eduation (group) as the most significant predictors (.05 level).

Hypothesis two is not accepted.

Previous science, scholastic ability and father's education were the most significant predictors ($p<.000$). Group was not.

Hypothesis Three: The best regression equation for grade five science achievement will include previous science scores, scholastic ability (Chinese and mathematics achievement), father's education, and inservice teacher education (group) as the most significant predictors (.05 level).

Hypothesis three is not accepted.

Results for grade five were similar to grade four. Previous science, scholastic ability, and father's education were the most significant predictors ($p<.000$). Group was not.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

Summary of the Study

The purpose of this study is to find the strongest predictors of science achievement.

The selected variables in this study are:(1)student characteristics: student's age and sex, parental education and occupation, student's Chinese achievement, mathematics achievement and science achievement; (2) teacher characteristics: inservice teacher training; (3) school or school districts conditions: school size. The grade level involved are grades three, four and five.

The 91 elementary schools that had been involved in the Project of Elementary School Science Curriculum Study (1979-1986) were the population of this study. Thirty-eight schools (2950 students) for the population were selected for the sample of this study. The schools were distributed throughout the country and were representative of large and middle size schools; all small schools were delimited from the study due to lack of non-experimental classes. Each

school had one experimental and one non-experimental class involved in this study.

The Ban-Chyau Teacher Center provided information of the name of experimental schools, school size of each school, and science test results. The 38 elementary schools supplied information for the student's age and sex, parental education and occupation, and Chinese achievement and mathematics achievement.

Data were analyzed through frequencies, correlations and stepwise multiple regression by the programs of the Statistical Package for the Social Science (SPSSx).

Summary of Findings

Science Achievement for Grade Three

Student's background variables accounted for about ten percent of the variance. Father's education accounted for about four percent of the variance. Scholastic ability (Chinese and mathematics achievement) accounted for about 26 percent of the variance (20 percent of the variance when home background was removed). Previous science accounted for 30 percent of the variance of the second semester of grade three (ten percent of the variance when home background and scholastics ability were removed).

Group did not enter as one of the most significant variables. Group had a correlation of .0574 ($p<.01$) for the

first semester and -.0101 for the second semester with science achievement; most of this relationship was explained by family background and scholastic ability of the students.

School size did not make a substantial contribution to the variance (less than one percent).

Student background, scholastic ability and previous science accounted for 38 percent of the variance for the second semester at grade three.

Science Achievement for Grade Four

Student's background variables accounted for about 11 percent of the variance. Father's education accounted for about five percent of the variance. Scholastic ability (Chinese and mathematics achievement) accounted for 35 percent of the variance (27 percent of the variance when home background was removed). Previous science accounted for an average of 29 percent of the variance (15 percent of the variance when home background and scholastic ability were removed).

Group did not enter as one of the most significant variables. Group had a correlation of .0223 for semester one and .0468 ($p<.05$) for semester two with science achievement at grade four; but most of this relationship was explained by family background and scholastic ability of the students.

School size did not make a substantial contribution to the variance (less than one percent).

Student background variables, scholastic ability and previous science accounted for over 53 percent of the total variance for grade four.

Science Achievement for Grade Five

Student's background variables accounted for about ten percent of the variance. Father's education accounted for about four percent of the variance. Scholastic ability (Chinese and mathematics achievment) accounted for about 36 percent of the variance (30 percent of the variance when background was removed). Previous science accounted for about 38 percent of the variance (14 percent of the variance when home background and scholastic ability were removed).

Group did not enter as one of the most significant variables. Group had a correlation of .0022 for semester one and .0535 ($p<.01$) for semester two with science achievement at grade five; most of this relationship was explained by family background and scholastic ability of the students.

School size did not make a substantial contribution to the variance (less than one percent).

Student background variables, scholastic ability and previous science accounted for about 53 percent of the variance at grade five.

Overall, student home background accounted for about ten percent of the variance. Scholastic academic ability added 20 to 30 percent of the variance, and previous science achievement added about ten to 15 percent of the variance. The highest explained variance is 58 percent of the total variance.

CONCLUSIONS AND DISCUSSION AND COMPARISON TO LITERATURE

The major findings of this study are presented along with related discussions.

Student Characteristics

Home Background Variables

Parental education had a significant relationship to the student's academic achievement.

Home background accounted for nine to 13 percent of the variance for science achievement. These findings are consistent with Walker's (1976) analyses for studies in the United States. In Walker's study (1976), the home background variables accounted for 11 percent of the variance of science achievement. Lin (1982) found that socio-economic status accounted for eight percent of the variance of the sixth grader's academic achievement in the Republic of China. The explained variance in this study is higher than Lin's study. However, Lin's study did not specify

what subjects areas were included as "academic" achievement in his study.

The significant impact of parental education, especially father's education is also consistent with other findings from the Republic of China (Lu, 1976; Yao, 1985) and in the United States (NAEP, 1971; NAEP, 1973; Norris, 1972; Sauls, 1976; Ahmann, 1982).

These findings support the importance of good education, not only for the current students, but also for its impact on the learning of the next generation.

Scholastic Ability

Students who achieved successfully in science also performed well in mathematics and Chinese.

Scholastic ability added about 20 to 30 percent of the variance of science achievement.

Correlation coefficients between science and Chinese (language ability) ranged from r=.36 to r=.50 and for science and mathematics from .45 to .62. These results are close to the findings from meta-analysis of Fleming and Malone (1982). Fleming and Malone (1982) reported that the correlations between science and language, science and mathematics, and science and general abibilty were .41, .42, .43 respectively.

Prior knowledge

Previous science achievement was a strong predictor of science achievement. It added about ten to 15 percent to the explained variance. This tends to indicate that the elementary school curriculum was articulated for grades three, four, and five in the Republic of China. The correlations are stronger than those found for many studies in the United States. Students who learned science required, regardless of group, made the best progress in later years.

Sex

Boys scored slightly higher than girls in science achievement for all six semesters.

The correlations between science achievement and sex ranged from .038 to .073. Gender accounts for less than one percent of the variance. This finding is consistent with others (Comber & keeves, 1973; Herman, 1973; Fleming & Malone, 1982; Kahl, 1982; Maehr & Steinkamp, 1983).

Girls consistently achieved higher than boys in Chinese for all six semesters. This finding is also consistent with literature (Lewis, 1983).

Other variables

These were not included in the study.

Teacher Characteristics

The inservice teacher training program from the Ban-Chyau Teacher Center had a low statistical impact, and not a practical significant impact on student science achievement. It also did not have a strong cumulative effect on science achievement (explained variance did not show any substantial increase).

Previous literature shows that inservice teacher training program can have an impact on teachers (Hunkler, 1971; Bedwell, 1974; Hounshell & Liggett, 1976; Champagne, 1980; Bethel et al., 1982; Druva & Anderson, 1982; Cooper, 1983; Ellis & Zielinski, 1983; Riley & Faller, 1983; Ouyand, 1983; Halperin, 1985; Lawrenz, 1986). However, findings are not consistent. Some studies indicate that inservice teacher training had an impact on students' achievement (Hunkler, 1971; Pinkall, 1973; Hounshell & Liggett, 1976; Champagne 1980; Druva & Anderson, 1982). Some studies indicated that inservice teacher training had no impact on students' achievement (McBridge, 1967; Smith, 1970; Bedwell, 1974; Lawrenz, 1986).

There are several possible explanations for this finding. The first possibility is that the inservice teacher training program was not effective; therefore, it did not show much impact on students' science achievement.

But, there are also several other possibilities. A second alternative explanation is that the experimental group teachers helped the non-experimental group teachers. This kind of "contamination" would have decreased the differential effects of inservice teacher training program on science achievement.

A third alternative explanation is that some teachers (a few) made effective use of the inservice education and others did not, thus decreasing the statistical impact of the inservice work.

A fourth alternative explanation is that non-experimental group teachers might not have followed the Test Guide exactly when they gave tests to the non-experimental group students. The Test Guide required teachers to repeat the questions only when students asked a question. However, it is unknown whether classroom teachers followed the rule or tried to explain more; such action might be a kind of hint and might help non-experimenal classes students achieve higher. This effect however, is unlikely due to consistent relationships between group and science achievement over three years.

The reason that inservice teacher edcation (group) did not explain more variance obviously requires further study.

School or School District Conditions

School Size

School size was not a major predictor of science achievement.

School size significantly correlated to Chinese, mathematics and science achievement for several semesters. But the correlation coefficients were small ($r=.043$ to $r=.132$). Regression analyses showed that it accounted for less than one percent of academic achievement.

This finding is consistent with some previous studies such as Brookover et al. (1979), but did not agree with NAEP's findings.

Within School Conditions

These were not included in this study.

Teaching Performance

Inservice education was a variable in the study. It did not distinguish between teacher performance of the experimental and non-experimental teachers. Variables such as emphasis of objectives, time devoted to objectives, and quality of instruction may relate to achievement.

Student Behavior

Engaged time related to assessment frequently explains a significant amount of the variance. This was not included

in the study and could account for some of the unexplained variance.

Summary

The model selected from the literature provided an average of 60-70 percent of the variance. In this study, a mean of 50 percent of the variance can be explained, varying from 38 to 58 percent of the variance. The addition of variables related to within school conditions and teacher performance, would probably add the most to the explained variance. While some variables related to student behavior and student characteristics might add more to the the explained variance, these were probably explained by achievement variables included. Teacher characteristics such as knowledge and expectations might also add to the explained variance.

RECOMMENDATIONS

Based on the analyses in this study, the following studies and programs are recommended.

1. Further analysis should be done to analyze the impact of the inservice teacher education program. If the inservice program is found to be effective, then the inservice program should be expanded. If the inservice program is found not to be effective, then the inservice program should be reviewed and modified.

It is recommended that another 38 elementary schools be selected and that a class from each school at each grade level (three, four, five) should be studied. Give the same test to students at the end of each semester. Compare the science achievement of those schools with the experimental schools to determine if those schools are achieving as well as the experimental schools. The results would help explain whether there was an impact of the inservice program on the experimental schools and that contamination of the non-experimental classes "masked" the difference. If the schools that were not involved in the experimental program achieve significantly lower (when corrected for student differences) than the experimental program, then the inservice program probably was effective. If the new sample achieve about the same as the experimental schools, then it would indicate the same results as this study.

2. The congruence among science curriculum goals, instruction, instructional materials and evaluation should be analyzed to help improve science teaching. The test scores on items suggest a lack of congruence. The following studies are recommended.

   a. Check the congruence between tests and the curriculum.

Experts should analyze the test items and the percentage of the content in the curriculum (grades three to five individually) to confirm the choice of items by previous developers. If the test items agree with the percentage of the content in the curriculum, then the curriculum and tests are congruent. If the test items and the percentage of content in the curriculum do not agree, then, there is a lack of congruence between the tests and the curriculum. In this case, data should be recalculated for possible changes and reanalyzed considering the emphasis of the intended curriculum.

b. Check the congruence between tests and instruction.

Give the tests to the experimental group teachers and ask them to rank test items from high emphasis to low emphasis (such as 3: high emphasis; 2:average emphasis; 1:low emphasis; 0: no emphasis). Based on the teachers' emphasis, reanalyze the test data to check whether the actual curriculum (what teachers really taught in classes) is congruent with the intended curriculum and how student achievement relates to emphasis.

c. Analyze the difficult items.

Difficult items may be explained because (1) they were not a part of the intended curriculum or a low emphasized item or (2) had low teacher emphasis (low emphasis on actual curriculum).

If items are not explained by the above reasons, the items should be analyzed for required reasoning skills and content involved.

3. This study analyzed mean achievement scores of students. Data should also be examined to identify gain scores for students and to examine the teachers performance and student behaviors on the classes with the best g. in scores.

4. Design a continuing educational program for fathers who have lower educational level and who would like to have a chance to study again; this would help them be more effective in influencing their children's learning.

The program should be offered during weekends or night time (as are current programs for mothers) by junior high schools (emphasize academic study) or vocational schools (emphasize working skills). Evaluation of the effects of the program and its impact on the achievement of the children should be followed.

5. Help low achieving (including science, Chinese and mathematics) students as early as possible. Evidence indicated early success was related to later success. Programs should be established to help students master essential work and to provide assistance for children that do not maintain grade level achievement. Data indicate that most of the students who do not achieve at grade level continue to lag.

The high correlations among subjects indicate that the learning of one subject often influences the learning of other subjects. To improve the curriculum between subjects, connections should be taken into consideration as well.

Appendix A

THE COMMITTEE OF THE PROJECT OF ELEMENTARY SCHOOL SCIENCE CURRICULUM STUDY IN THE BAN-CHYAU TEACHER CENTER

Director: Dr.Guan-Cheng Yang and Dr.Hung-ming Kuo

Committee members:

Mr. Song-Lin Mao, Ms. Tien-Ying Lee,
Dr. Ching-Shan Lin, Dr. Wen-Shiang Chi,
Mr. Shiaw-Yi Yuan, Mr. Chien-Chi Ts'ui,
Mr. Chien-Shiun Chen, Dr. Chin-Chi Chao,
Dr. Mu-Chao Liu, Dr. Chin-Ming Lu,
Mr. Ming-Tung Wei

Edit Committee(Selected good teachers):

Mr. Chung-neng Chu, Mr. Ya-chen Yu,
Mr. Der-Chih Lee, Ms. Hsin-Chen Wu,
Ms. Mei-Chin Yu, Mr. Pin-Yun Hu,
Mr. Shih-Hsu Hwang, Mr. Shou-Jen Chen
Mr. Yao-Tin Hsu, Mr. Shih-Lin Ch'iu
Mr. Lun-Chi'ang Yeh Mr. Chin-Lung Tsai

(The names and order of names are translated from the Chinese Version)

Appendix B

SCIENCE TEST GUIDE AND TEST QUESTIONS OF THE FIRST SEMESTER OF THE FIFTH GRADE

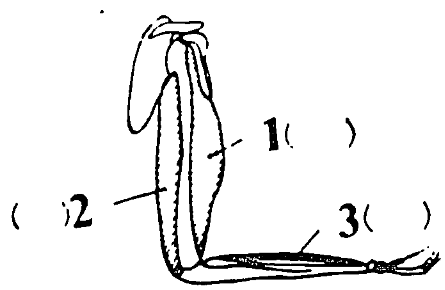
The sample test presented here has been merged to avoid redundancy. The following parts are provided in the Chinese version, however, they are omitted here.

1. Teacher announcement before the test;
2. Test instructions with required equipment;
3. Directions for test administration.

The test was translated from the Chinese version. Each question included two parts. The first part is the test guide. The second part is the question itself. Two parts are separated by a line.

Question 1.
Criteria: To see if the student can infer the interaction/ movement of muscles and bones.
Teacher: Please look at the picture on your test, if you want to straighten your arm, which part of the muscle will shrink?
Correct Answer: 2

1.



If you want to straighten your arm, which part of the muscle will shrink?

Question 2.
Criteria: To see interactions between muscles and bones.
Teacher: What is the mechanism of hand movement? Please mark all correct answers.
Correct Answers: 1,4

2.What is the mechanism of hand movement?
( )1.The combined action of muscles and bones will cause movement.
( )2.Your hand will move, only if you have strong muscles.
( )3.Your hand will move, only if you have hard bones.
( )4.Movement is caused by the shrinking of muscles which pull bones.

Question 3.
Criteria: Demonstrate that cold air is heavier than hot air. The different temperature of air causes a difference in air pressure and is responsible for the circulation of air.
Teacher : What phenomena can you explain with the movement of smoke? Mark all correct answers.
Correct Answers: 1,3

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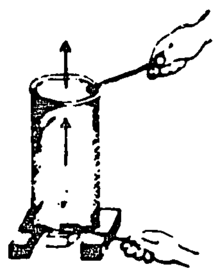
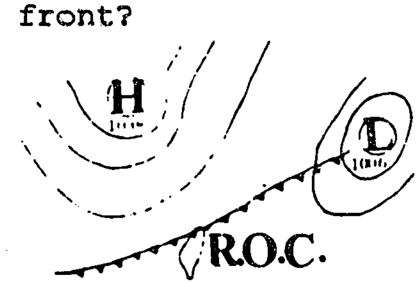
3. Hands are holding burning joss sticks. Arrows represent the direction of smoke movement.



By the movement of smoke ,what phenomena can you explain?
( )1.Warm air is lighter and its air pressure is lower.
( )2.Cold air is lighter, and its air pressure is lower.
( )3.Air moves from the place with higher air pressure to the place with lower air pressure.
( )4.Air moves from the place with lower air pressure to the place with higher air pressure.

Question 4.
Criteria: To determine if a student can explain a weather map and trends of weather changing patterns.
Teacher: 1.This weather map represents one day in January. What kind of front is approaching the area of the Republic of China?
2.What kind of weather changes will take place around the area which is influenced by this front?
Correct Answers: A:1, B:2,4

4.A.From this weather map, what kind of front is approaching the area of the Republic of China?
( )1.cold front ( )2.warm front ( )3.unstable front
B.What kind of weather change will occur around the area which is influenced by this front?
( )1.Temperature will rise.
( )2.Temperature will drop.
( )3.The area will have clear and hot weather.
( )4.Clouds will increase and will have bad weather.



Question 5.

Criteria: To show that Oxygen helps burning and Oxygen is colorless and orderless.

Materials: 1. Three 250 c.c. bottles:
 1st bottle is filled with air.
 2nd bottle is filled with O_2.
 3rd bottle is filled with CO_2.
 2. candle, burning spoon, match, glsss plates.

Teacher: 1. There are three bottles which were filled with different gases.
 2. I will put a burning candle into each bottle for 3 seconds. Please observe carefully. (Teacher demonstrates the experiment.)
 3. Which bottle has Oxygen inside? (wait until students finish.)
 4. How do you know that Oxygen is inside the bottle? Please write down your reason.

Correct Answers: A. 2
 B: Because the flame became brighter, or larger etc.
 Because Oxygen helps burning.

---

5. A. Which bottle contained the Oxygen inside?
 1. ( ) 2. ( ) 3. ( )

 B. Your reason: ____________________

Question 6.

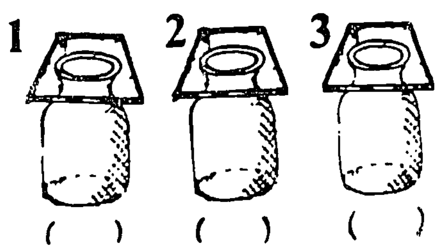
Criteria: According to observations, students can identify an operational definition of CO_2.

Materials: 1. Three bottles: 1st bottle filled with CO_2.
2nd bottle filled with O_2.
3rd bottle filled with air.
2. One glass of clean $CaCO_3$ water.
3. Three glass plates.

Teacher: 1. There are three bottles with different gases inside.
2. There is a glass of clean $CaCO_3$ water. I will pour the same amount of $CaCO_3$ water into each bottle (Teacher demonstrates the experiment.) Which bottle do you think has CO_2 inside?
3. How do you know ? Please write an operational definition of CO_2.

Correct Answers: A. 1
B. CO_2 is a kind of gas which will make clean $CaCO_3$ water turn to a white color.

6.



A. Which bottle has CO_2 inside?

B. Operational definition: ______
____

Question 7.
Criteria: Observe from a microscope, then write down an operational definition of a cell.
Teacher: 1. Pictures on your test were drawn by Shaw-Ying when she observed the cells of elodea leaf and onion skin.
2. Which one of the following definitions do you think, is the best operational definition of a cell?
Correct Answer: 3

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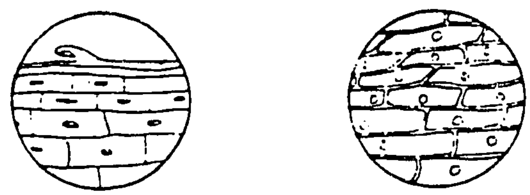
7. Which one of the following definitions do you think, is the best operational definition of a cell?



( )1. The cell is the basic unit for a plant structure. It is circular in shape.
( )2. The cell must be lattice shaped for a plant structure. It has no nucleus.
( )3. A cell of a plant is rectangular lattice, inside each rectangular there is a nucleus.
( )4. A cell of a plant consists of walls. It is round.

<u>Question 8</u>.

Criteria: Living things are made up of cells.

Teacher: 1. There are four pictures which were drawn by Shaw-Ying when she looked through a microscope. They are : a. elodea leaf; b. onion skin; c. cheek cell; d. salt.

2. Please look at each picture carefully and mark all correct descriptions.

Correct Answers: 2,3

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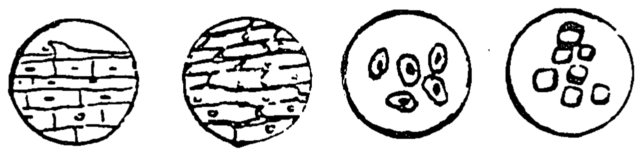
8. Observe pictures carefully, then select all correct answers.



( )1. The shapes of these pictures are regular and neat, so all are cells.

( )2. Animals have different shapes, size and structure. However, all animals are made up of cells.

( )3. Cheek cells and onion cells have different shapes, but both have a cell nucleus.

( )4. Cells make up everything in the world.

<u>Question 9</u>.

Criteria: To compare the rolling speed by controlling variables.

Teacher: There are 6 different cylinders. If you want to know how empty and solid insides influence rolling speed, which pair/pairs will you select in your experiment? Please write down your numbers by pair.

Correct Answers: (5,3), (2,6), (4.1)

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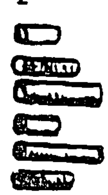
9. If you want to know the effect of a cylinder's 'empty inside or solid inside' to its rolling speed, please write down which pair you select.



(1) empty iron
(2) empty aluminium
(3) empty plastics
(4) solid iron
(5) solid plastics
(6) solid aluminium

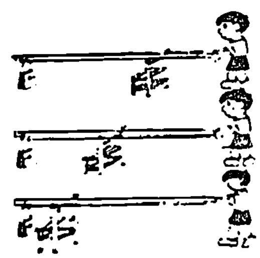
Question 10.
Criteria: Recognize variables which may influence the rolling speed of a cylinder from a slope.
Teacher: When you release a cylinder from a slope, which variables do you think will have an influence on the cylinder's rolling speed?
Correct Answers: cannot have 1,5,6. must have 3,4.

10.Which variables will influence the rolling speed of a cylinder when it is released from the top of a slope?
( )1.temperature of classroom.
( )2.whether the surface of cylinder is rough or smooth
( )3.angles of slope
( )4.cylinder is empty inside or solid inside
( )5.the pen with which you keep record
( )6.color of the slope
( )7.length of cylinder
( )8.diameter of the cylinder

Question 11.
Criteria: The balance of a lever is influenced by its support point and weight.
Teacher: Please mark the easiest way for Shaw-Hwa to raise the bag.
Correct Answer: 3

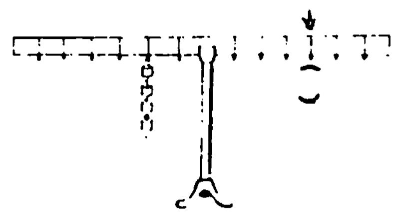
11.Which is the easiest way for Shaw-Hwa to raise the bag?

( ) 1
( ) 2
( ) 3



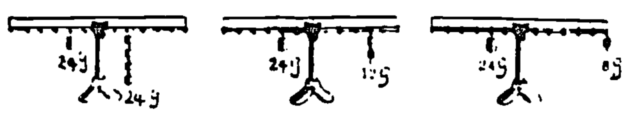
Question 12.
Criteria: The balance of a lever is influenced by the position of the support point and weight.
Teacher: If you want to balance the lever, how many units do you need to put in the place where there is an arrow? Please write down your answer.
Correct Answer: 1

12.There are four 10 gram weights hanging on the 2 units left from the center of the lever. How many 10 gram weights do you need to hang on the 4 units right from the center of the lever?



Question 13.
Criteria: Based on the data, students can develop a hypothesis about the balance of a lever.
Teacher: Data on your answer sheet are done by Shaw-Hwa. Please select all possible hypotheses.
Correct Answers: 1,4

13.The following experimental results are done by Shaw-Hwa. From data, please pick all possible hypotheses.



( )1.The closer to the support point, the more weight is needed. The further from the support point, the less weight is needed.
( )2.The closer to the support point, the less weight is needed. The further from the support point, the more weight is needed.
( )3.Consider both sides of the support point, when 'distance plus weight' are equal, the lever will be balanced.
( )4.Consider both sides of the support point, when 'distance times weight' are equal, the lever will be balanced.

Question 14.
Criteria: Wheels will help people, either by saving energy or offering convenience.
Teacher: If you want to pick up a heavy barrel, which one cannot save energy?
Correct Answer: 3

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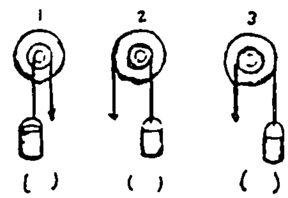
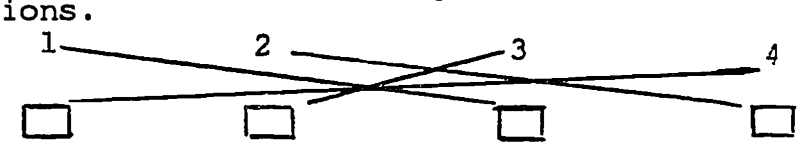
14. If you want to pick up a heavy barrel, which of the following cannot save energy?



Question 15.
Criteria: A pulley can help people save energy or give convenience.
Teacher: There are four systems of pulleys. How do they help us work? Please match diagrams with explanations.
Correct Answers:



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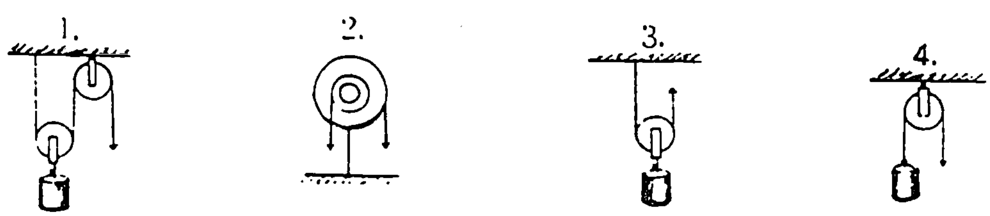
15. How can the following systems of pulleys help us work? Please match diagrams with explanations.



Change force direction, not save energy.

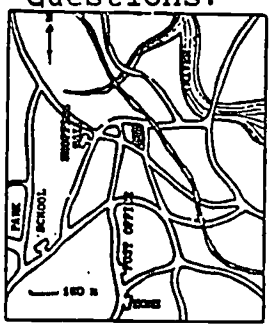
Save energy, not change force direction.

Save energy and change force direction.

Save energy or time.

Question 16.
Criteria:The student can use an object as a reference to identify position of objects.
Material: rule (student prepared)
Teacher: Observe the map carefully,then answer questions.
Correct Answers: A.south-west
B.400 meters to 750 meters

16.Observe the map carefully, then answer the following questions.



A.Shaw-Ying wants to go to school. She has to walk north until the cross road. Then in what direction does she have to go?

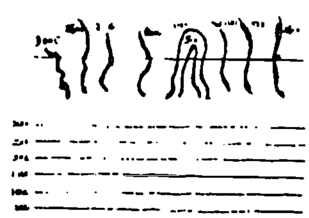
____

B.How far is it from the shopping center to Shaw-Ying's house?

____

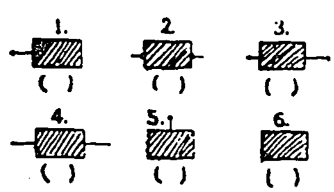
Question 17
Criteria:To be able to use a geographical map to determine the location of a slope and valley of a mountain.
Teacher: Here is a geographical map which shows the equal height lines from place A to place B. Please show the topographical change from A to B.
Correct Answer:

17.Please draw the topographical change from place A to place B.

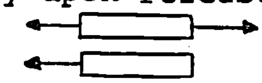


Question 18.
Criteria: Force changes an object's motion.
Teacher: There are six force figures. Please identify which one will not move.
Correct Answers: 2,4,6

18.Please observe the following force figures, and identify the objects that will not move.



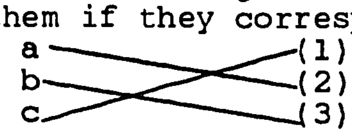
Question 19.
Criteria: To determine if students can draw a picture to show force's direction and magnitude.
Teacher: 1. Here is a car. Please observe what I am doing carefully.
2. Teacher places a rubber band on one end of the car and fastens it with a nail. Teacher holds the car's other end to keep the car motionless. Then the teacher says "Please draw a force picture to show force/forces on the car."
3. "Please observe what I am doing now." Teacher releases the car. Teacher says "Please draw a force picture of the car immediately upon release."

Correct Answers: A. B.


19.(1). Please draw a force picture of a static car as shown by the teacher.

(2). Please draw a force picture of the car right after it was released by the teacher.

Question 20.
Criteria: Force changes an object's motion.
Teacher: There are three diagrams and explanations. Please match them if they correspond with each other.

Correct Answers:


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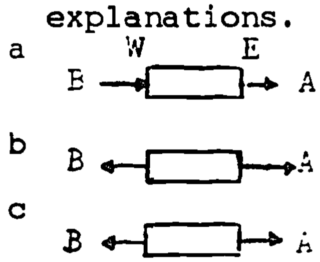
20. Please match force diagrams and corresponding explanations.



(1). Force A towards east. Force B towards west. Two forces are equal and block will not move.

(2). Both forces A and B toward east and block moves.

(3). Force A towards east. Force B towards west. A is greater than B. Block moves towards east.

Appendix C

CATEGORIES AND CODINGS OF ALL VARIABLES

1. Parental occupation

Categories	Code for father's job	Code for mother's job
farmer	FJ1	MJ1
worker	FJ2	MJ2
engineer	FJ3	MJ3
businessman(own stores)	FJ4	MJ4
fisher	FJ5	MJ5
miner	FJ6	MJ6
transporation(bus driver etc.)	FJ7	MJ7
teacher	FJ8	MJ8
governmental officer	FJ9	MJ9
soldier	FJ10	MJ10
company(own factory)	FJ11	MJ11
others(medical doctor etc.)	FJ12	MJ12
no job	FJ13	
housewife		MJ13
deceased	FJ14	MJ14

2. Parental education (coded highest education level)

Categories	Code for father's ed.	Code for mother's ed.
no education at all	FED1	MED1
can read and write	FED2	MED2
elementary school	FED3	MED3
junior high school(grade7-9)	FED4	MED4
senior high school(grade10-12)	FED5	MED5
college/university or above	FED6	MED6

3. Chinese and Mathematics Achievement Codes

grade level	Chinese Code	Mathematics Code
grade 3, semester 1	C1	M1
grade 3, semester 2	C2	M2
grade 4, semester 1	C3	M3
grade 4, semester 2	C4	M4
grade 5, semester 1	C5	M5
grade 5, semester 2	C6	M6

4. Science Achievement Codes

grade level	science code
grade 3, semester 1	Totsone
grade 3, semester 2	Totstwo
grade 4, semester 1	Totsth

grade 4, semester 2 Totsfour
grade 5, semester 1 Totsfive
grade 5, semester 2 Totssix

5. Other variables

group: the experimental group in which the teacher was trained was coded as one; the non-experimental group which represented no training was coded zero.

school size (ssize): a large school was coded one; a middle sized was coded zero.

sex: 1 and 0 was used for male and female respectively.

age: student's actual age in 1986.

Appendix D

CORRELATION MATRICES OF ALL VARIABLES

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	GROUP	SSIZE	SEX	AGE	FJ1
GROUP	1.0000 (0) P= .	-.0081 (2950) P= .661	.0026 (2950) P= .888	-.0419 (2947) P= .023	-.0382 (2889) P= .040
SSIZE	-.0081 (2950) P= .661	1.0000 (0) P= .	.0038 (2950) P= .835	-.0081 (2947) P= .662	-.1398 (2889) P= .000
SEX	.0026 (2950) P= .888	.0038 (2950) P= .835	1.0000 (0) P= .	.0284 (2947) P= .123	.0328 (2889) P= .078
AGE	-.0419 (2947) P= .023	-.0081 (2947) P= .662	.0284 (2947) P= .123	1.0000 (0) P= .	.0629 (2886) P= .001
FJ1	-.0382 (2889) P= .040	-.1398 (2889) P= .000	.0328 (2889) P= .078	.0629 (2886) P= .001	1.0000 (0) P= .
FJ2	.0191 (2889) P= .306	.0474 (2889) P= .011	.0019 (2889) P= .920	-.0132 (2886) P= .480	-.2667 (2889) P= .000
FJ3	-.0434 (2889) P= .020	.0471 (2889) P= .011	-.0325 (2889) P= .081	-.0302 (2886) P= .105	-.0426 (2889) P= .022
FJ4	.0230 (2889) P= .216	.0863 (2889) P= .000	-.0286 (2889) P= .124	-.0214 (2886) P= .250	-.2372 (2889) P= .000
FJ5	.0384 (2889) P= .039	-.2739 (2889) P= .000	.0250 (2889) P= .179	.0167 (2886) P= .314	-.0950 (2889) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	GROUP	SSIZE	SEX	AGE	FJ1
FJ7	.0000 (2889) P= .999	.0286 (2889) P= .124	-.0237 (2889) P= .204	-.0074 (2886) P= .691	-.0810 (2889) P= .000
FJ8	.0095 (2889) P= .611	.0339 (2889) P= .069	-.0249 (2889) P= .181	.0039 (2886) P= .835	-.0727 (2889) P= .000
FJ9	.0073 (2889) P= .694	.0761 (2889) P= .000	.0266 (2889) P= .153	-.0413 (2886) P= .026	-.1222 (2889) P= .000
FJ10	-.0431 (2889) P= .021	.0168 (2889) P= .368	.0197 (2889) P= .289	-.0115 (2886) P= .536	-.0531 (2889) P= .004
FJ12	-.0229 (2889) P= .219	.0206 (2889) P= .268	-.0003 (2889) P= .989	.0435 (2886) P= .020	-.0633 (2889) P= .001
MJ1	-.0462 (2670) P= .017	.0095 (2670) P= .622	-.0048 (2670) P= .804	.0343 (2667) P= .076	.3419 (2640) P= .000
MJ2	-.0804 (2670) P= .000	-.0242 (2670) P= .211	-.0071 (2670) P= .712	-.0072 (2667) P= .711	-.0193 (2640) P= .321
MJ4	-.0186 (2670) P= .336	.0129 (2670) P= .505	-.0135 (2670) P= .466	-.0105 (2667) P= .589	-.1052 (2640) P= .000
MJ5	.0053 (2670) P= .793	-.2385 (2670) P= .000	.0263 (2670) P= .174	-.0320 (2667) P= .098	-.0178 (2640) P= .360
MJ8	.0019 (2670) P= .923	.0445 (2670) P= .022	-.0381 (2670) P= .049	-.0136 (2667) P= .484	-.0543 (2640) P= .005

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	GROUP	SSIZE	SEX	AGE	FJ1
MJ9	.0032	.0197	-.0196	-.0253	-.0519
	(2670)	(2670)	(2670)	(2667)	(2640)
	P= .868	P= .309	P= .310	P= .192	P= .006
MJ13	.0805	.0592	.0223	.0239	-.0046
	(2670)	(2670)	(2670)	(2667)	(2640)
	P= .000	P= .002	P= .249	P= .216	P= .814
FED1	-.0399	-.0402	.0052	.0476	.0091
	(2845)	(2845)	(2845)	(2842)	(2804)
	P= .034	P= .032	P= .783	P= .011	P= .630
FED2	-.0193	-.0175	.0275	.0482	.0831
	(2845)	(2845)	(2845)	(2842)	(2804)
	P= .303	P= .351	P= .143	P= .010	P= .000
FED3	.0518	-.1085	.0219	.0307	.1886
	(2845)	(2845)	(2845)	(2842)	(2804)
	P= .006	P= .000	P= .244	P= .101	P= .000
FED4	-.0333	.0370	-.0273	-.0029	-.0446
	(2845)	(2845)	(2845)	(2842)	(2804)
	P= .076	P= .048	P= .146	P= .877	P= .018
FED5	.0015	.0871	.0015	-.0346	-.1214
	(2845)	(2845)	(2845)	(2842)	(2804)
	P= .936	P= .000	P= .936	P= .065	P= .000
FED6	-.0179	.0458	-.0163	-.0430	-.1296
	(2845)	(2845)	[illegible]	(2842)	(2804)
	P= .339	P= .015	[illegible]	P= .022	P= .000
MED1	-.0056	-.0491	.0114	.0329	.1297
	(2555)	(2555)	(2555)	(2552)	(2502)
	P= .779	P= .013	P= .566	P= .097	P= .000
MED2	-.0114	-.0131	.0113	-.0097	[illegible]
	(2555)	(2555)	(2555)	(2552)	[illegible]
	P= .565	P= .508	P= .566	P= .623	P= .361

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	GROUP	SSIZE	SEX	AGE	FJ1
MED3	.0399	-.0575	.0170	.0471	.0859
	(2555)	(2555)	(2555)	(2552)	(2502)
	P= .044	P= .004	P= .389	P= .017	P= .000
MED4	-.0352	.0676	.0052	-.0332	-.0849
	(2555)	(2555)	(2555)	(2552)	(2502)
	P= .075	P= .001	P= .791	P= .094	P= .000
MED5	-.0152	.0570	-.0314	-.0368	-.0973
	(2555)	(2555)	(2555)	(2552)	(2502)
	P= .441	P= .004	P= .112	P= .063	P= .000
MED6	.0017	.0091	-.0259	-.0410	-.0747
	(2555)	(2555)	(2555)	(2552)	(2502)
	P= .930	P= .645	P= .190	P= .039	P= .000
C1	-.0824	.0871	-.1583	-.0062	-.1906
	(2946)	(2946)	(2946)	(2943)	(2866)
	P= .000	P= .000	P= .000	P= .738	P= .000
M1	-.0179	.0547	-.0359	-.0025	-.1758
	(2946)	(2946)	(2946)	(2943)	(2866)
	P= .332	P= .003	P= .052	P= .893	P= .000
C2	-.0896	.1034	-.1695	.0104	-.1730
	(2949)	(2949)	(2949)	(2946)	(2889)
	P= .000	P= .000	P= .000	P= .574	P= .000
M2	-.0433	.0873	-.0369	.0045	-.1499
	(2949)	(2949)	(2949)	(2946)	(2889)
	P= .019	P= .000	P= .045	P= .806	P= .000
C3	-.0758	.1293	-.1745	-.0108	-.1727
	(2949)	(2949)	(2949)	(2946)	(2889)
	P= .000	P= .000	P= .000	P= .556	P= .000
M3	-.0488	.1139	-.0329	.0000	-.1618
	(2949)	(2949)	(2949)	(2946)	(2889)
	P= .008	P= .000	P= .074	P= .999	P= [illegible]

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	GROUP	SSIZE	SEX	AGE	FJ1
C4	-.0681 (2949) P= .000	.1019 (2949) P= .000	-.1833 (2949) P= .000	-.0154 (2946) P= .404	-.1659 (2889) P= .000
M4	-.0425 (2949) P= .021	.0770 (2949) P= .000	-.0570 (2949) P= .002	.0040 (2946) P= .827	-.1124 (2889) P= .000
C5	-.0331 (2949) P= .073	.0859 (2949) P= .000	-.1893 (2949) P= .000	-.0086 (2946) P= .640	-.1827 (2889) P= .000
M5	-.0211 (2949) P= .252	.0173 (2949) P= .347	-.0434 (2949) P= .018	-.0158 (2946) P= .392	-.1587 (2889) P= .000
C6	-.0338 (2947) P= .067	.1143 (2947) P= .000	-.1927 (2947) P= .000	-.0078 (2944) P= .672	-.1838 (2887) P= .000
M6	-.0337 (2947) P= .068	.0434 (2947) P= .018	-.0464 (2947) P= .012	-.0049 (2944) P= .792	-.1639 (2887) P= .000
TOTSONE	.0574 (2759) P= .003	.0730 (2759) P= .000	.0559 (2759) P= .003	.0246 (2757) P= .197	-.1415 (2704) P= .000
TOTSTWO	-.0101 (2543) P= .610	.1320 (2543) P= .000	.0734 (2543) P= .000	.0153 (2540) P= .440	-.1182 (2491) P= .000
TOTSTH	.0223 (2122) P= .305	.0913 (2122) P= .000	.0377 (2122) P= .082	.0180 (2120) P= .406	-.1299 (2068) P= .000
TOTSFOUR	.0468 (2851) P= .012	.0757 (2851) P= .000	.0996 (2851) P= .000	.0010 (2848) P= .957	-.0735 (2791) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	GROUP	SSIZE	SEX	AGE	FJ1
TOTSFIVE	.0022 (2884) P= .907	-.0474 (2884) P= .011	.0648 (2884) P= .000	-.0127 (2881) P= .497	-.1042 (2824) P= .000
TOTSSIX	.0535 (2929) P= .004	-.0314 (2929) P= .089	.0351 (2929) P= .058	-.0274 (2926) P= .139	-.0864 (2869) P= .000

	FJ3	FJ4	FJ5	FJ7	FJ8
GROUP	-.0434 (2889) P= .020	.0230 (2889) P= .216	.0384 (2889) P= .039	.0000 (2889) P= .999	.0095 (2889) P= .611
SSIZE	.0471 (2889) P= .011	.0883 (2889) P= .000	-.2739 (2889) P= .000	.0286 (2889) P= .124	.0339 (2889) P= .069
SEX	-.0325 (2889) P= .081	-.0286 (2889) P= .124	.0250 (2889) P= .179	-.0237 (2889) P= .204	-.0249 (2889) P= .181
AGE	-.0302 (2886) P= .105	-.0214 (2886) P= .250	.0187 (2886) P= .314	-.0074 (2886) P= .691	.0039 (2886) P= .835
FJ1	-.0426 (2889) P= .022	-.2372 (2889) P= .000	-.0950 (2889) P= .000	-.0810 (2889) P= .000	-.0727 (2889) P= .000
FJ2	-.0724 (2889) P= .000	-.4029 (2889) P= .000	-.1614 (2889) P= .000	-.1377 (2889) P= .000	-.1235 (2889) P= .000
FJ3	1.0000 (0) P= .	-.0643 (2889) P= .001	-.0258 (2889) P= .166	-.0220 (2889) P= .237	-.0197 (2889) P= .290
FJ4	-.0643 (2889) P= .001	1.0000 (0) P= .	-.1435 (2889) P= .000	-.1224 (2889) P= .000	-.1098 (2889) P= .000
FJ5	-.0258 (2889) P= .166	-.1435 (2889) P= .000	1.0000 (0) P= .	-.0490 (2889) P= .008	-.0440 (2889) P= .018

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	FJ2	FJ3	FJ4	FJ5	FJ7	FJ8
FJ7	-.1377 (2889) P= .000	-.0220 (2889) P= .237	-.1224 (2889) P= .000	-.0490 (2889) P= .008	1.0000 (0) P= .	-.0375 (2889) P= .044
FJ8	-.1235 (2889) P= .000	-.0197 (2889) P= .290	-.1098 (2889) P= .000	-.0440 (2889) P= .018	-.0375 (2889) P= .044	1.0000 (0) P= .
FJ9	-.2077 (2889) P= .000	-.0332 (2889) P= .075	-.1846 (2889) P= .000	-.0739 (2889) P= .000	-.0631 (2889) P= .001	-.0566 (2889) P= .002
FJ10	-.0902 (2889) P= .000	-.0144 (2889) P= .439	-.0802 (2889) P= .000	-.0321 (2889) P= .084	-.0274 (2889) P= .141	-.0246 (2889) P= .187
FJ12	-.1076 (2889) P= .000	-.0172 (2889) P= .356	-.0957 (2889) P= .000	-.0383 (2889) P= .039	-.0327 (2889) P= .079	-.0293 (2889) P= .115
MJ1	-.0923 (2640) P= .000	-.0195 (2640) P= .318	-.0827 (2640) P= .000	-.0442 (2640) P= .023	-.0368 (2640) P= .059	-.0312 (2640) P= .108
MJ2	.1748 (2640) P= .000	.0390 (2640) P= .045	-.1115 (2640) P= .000	-.0441 (2640) P= .023	-.0250 (2640) P= .199	-.0[illegible]52 (2640) P= .005
MJ4	-.1396 (2640) P= .000	-.0202 (2640) P= .299	.2964 (2640) P= .000	-.0453 (2640) P= .020	-.0207 (2640) P= .287	-.0126 (2640) P= .517
MJ5	-.0930 (2640) P= .000	-.0155 (2640) P= .425	-.0823 (2640) P= .000	.4883 (2640) P= .000	-.0294 (2640) P= .131	-.0090 (2640) P= .643
MJ8	-.0683 (2640) P= .000	.0382 (2640) P= .050	-.0450 (2640) P= .021	-.0335 (2640) P= .085	-.0279 (2640) P= .152	.4125 (2640) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	FJ2	FJ3	FJ4	FJ5	FJ7	FJ8
MJ9	-.0852 (2640) P= .000	.0565 (2640) P= .004	-.0430 (2640) P= .027	-.0367 (2640) P= .060	-.0306 (2640) P= .116	.0663 (2640) P= .001
MJ13	.0960 (2640) P= .000	-.0343 (2640) P= .078	-.0180 (2640) P= .355	-.0496 (2640) P= .011	.0717 (2640) P= .000	-.0952 (2640) P= .000
FED1	.0857 (2804) P= .000	-.0168 (2804) P= .374	-.0558 (2804) P= .003	.0457 (2804) P= .016	-.0072 (2804) P= .702	-.0287 (2804) P= .129
FED2	-.0036 (2804) P= .849	-.0126 (2804) P= .504	-.0416 (2804) P= .027	.0267 (2804) P= .157	-.0076 (2804) P= .686	-.0215 (2804) P= .254
FED3	.1757 (2804) P= .000	-.1071 (2804) P= .000	-.1079 (2804) P= .000	.1715 (2804) P= .000	.0147 (2804) P= .436	-.1626 (2804) P= .000
FED4	.0187 (2804) P= .322	-.0500 (2804) P= .008	.0901 (2804) P= .000	-.0779 (2804) P= .000	.0555 (2804) P= .003	-.0854 (2804) P= .000
FED5	-.0842 (2804) P= .000	-.0524 (2804) P= .006	.1180 (2804) P= .000	-.1001 (2804) P= .000	-.0092 (2804) P= .626	-.0643 (2804) P= .000
FED6	-.2365 (2804) P= .000	.3073 (2804) P= .000	-.0414 (2804) P= .028	-.0859 (2804) P= .000	-.0724 (2804) P= .000	.5192 (2804) P= .000
MED1	.0276 (2502) P= .168	-.0312 (2502) P= .119	-.0987 (2502) P= .000	.0781 (2502) P= .000	-.0059 (2502) P= .770	-.0499 (2502) P= .012
MED2	.0325 (2502) P= .104	-.0137 (2502) P= .493	-.0051 (2502) P= .800	.0243 (2502) P= .225	-.0097 (2502) P= .627	-.0220 (2502) P= .272

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FJ2	FJ3	FJ4	FJ5	FJ7	FJ8
MED3	.1764	-.1188	-.0790	.0903	.0124	-.1610
	(2502)	(2502)	(2502)	(2502)	(2502)	(2502)
	P= .000	P= .000	P= .000	P= .000	P= .536	P= .000
MED4	-.0657	.0507	.0994	-.0909	.0423	-.0105
	(2502)	(2502)	(2502)	(2502)	(2502)	(2502)
	P= .001	P= .011	P= .000	P= .000	P= .034	P= .598
MED5	-.1624	.1161	.1024	-.0864	-.0334	.1504
	(2502)	(2502)	(2502)	(2502)	(2502)	(2502)
	P= .000	P= .000	P= .000	P= .000	P= .094	P= .000
MED6	-.1287	.0760	-.0062	-.0488	-.0408	.3256
	(2502)	(2502)	(2502)	(2502)	(2502)	(2502)
	P= .000	P= .000	P= .756	P= .015	P= .041	P= .000
C1	-.0718	.0316	.0882	-.0154	-.0025	.1037
	(2886)	(2886)	(2886)	(2886)	(2886)	(2886)
	P= .000	P= .090	P= .000	P= .408	P= .894	P= .000
M1	-.1049	.0220	.1149	-.0031	-.0313	.1020
	(2886)	(2886)	(2886)	(2886)	(2886)	(2886)
	P= .000	P= .237	P= .000	P= .869	P= .093	P= .000
C2	-.0714	.0309	.0842	-.0399	.0007	.0990
	(2889)	(2889)	(2889)	(2889)	(2889)	(2889)
	P= .000	P= .097	P= .000	P= .032	P= .970	P= .000
M2	-.1184	.0300	.1054	-.0103	-.0241	.1062
	(2889)	(2889)	(2889)	(2889)	(2889)	(2889)
	P= .000	P= .107	P= .000	P= .580	P= .195	P= .000
C3	-.0576	.0329	.0919	-.0693	.0094	.0963
	(2889)	(2889)	(2889)	(2889)	(2889)	(2889)
	P= .002	P= .077	P= .000	P= .000	P= .613	P= .000
M3	-.1091	.0279	.1141	-.0330	-.0326	.1141
	(2889)	(2889)	(2889)	(2889)	(2889)	(2889)
	P= .000	P= .134	P= .000	P= .076	P= .080	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	FJ2	FJ3	FJ4	FJ5	FJ7	FJ8
C4	-.0629 (2889) P= .001	.0318 (2889) P= .087	.0968 (2889) P= .000	-.0694 (2889) P= .000	.0109 (2889) P= .557	.0943 (2889) P= .000
M4	-.1350 (2889) P= .000	.0305 (2889) P= .101	.1164 (2889) P= .000	-.0413 (2889) P= .026	-.0301 (2889) P= .106	.1093 (2889) P= .000
C5	-.0765 (2889) P= .000	.0564 (2889) P= .002	.0896 (2889) P= .000	-.0343 (2889) P= .065	.0042 (2889) P= .821	.0963 (2889) P= .000
M5	-.1196 (2889) P= .000	.0488 (2889) P= .009	.0998 (2889) P= .000	-.0045 (2889) P= .810	-.0300 (2889) P= .107	.0986 (2889) P= .000
C6	-.0744 (2887) P= .000	.0471 (2887) P= .011	.0902 (2887) P= .000	-.0293 (2887) P= .115	.0089 (2887) P= .638	.1026 (2887) P= .000
M6	-.1098 (2887) P= .000	.0413 (2887) P= .027	.1056 (2887) P= .000	-.0307 (2887) P= .099	-.0194 (2887) P= .298	.1016 (2887) P= .000
TOTSONE	-.0669 (2704) P= .000	-.0269 (2704) P= .162	.0779 (2704) P= .000	.0086 (2704) P= .656	-.0018 (2704) P= .927	.0807 (2704) P= .000
TOTSTWO	-.0823 (2491) P= .000	.0185 (2491) P= .356	.0859 (2491) P= .000	-.0107 (2491) P= .594	-.0150 (2491) P= .454	.0869 (2491) P= .000
TOTSTH	-.1081 (2068) P= .000	.0156 (2068) P= .479	.0861 (2068) P= .000	.0436 (2068) P= .048	-.0458 (2068) P= .037	.0940 (2068) P= .000
TOTSFOUR	-.1228 (2791) P= .000	-.0036 (2791) P= .851	.0942 (2791) P= .000	-.0320 (2791) P= .091	-.0435 (2791) P= .021	.1033 (2791) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FJ2	FJ3	FJ4	FJ5	FJ7	FJ8
TOTSFIVE	-.0879	.0030	.0797	.0163	-.0258	.0914
	(2824)	(2824)	(2824)	(2824)	(2824)	(2824)
	P= .000	P= .873	P= .000	P= .388	P= .170	P= .000
TOTSSIX	-.1211	.0107	.0928	-.0061	-.0260	.1073
	(2869)	(2869)	(2869)	(2869)	(2869)	(2869)
	P= .000	P= .565	P= .000	P= .743	P= .163	P= .000

	FJ9	FJ10	FJ12	MJ1	MJ2	MJ4
GROUP	.0073	-.0431	-.0229	-.0462	-.0804	-.0186
	(2889)	(2889)	(2889)	(2670)	(2670)	(2670)
	P= .694	P= .021	P= .219	P= .017	P= .000	P= .336
SSIZE	.0761	.0168	.0206	.0095	-.0242	.0129
	(2889)	(2889)	(2889)	(2670)	(2670)	(2670)
	P= .000	P= .368	P= .268	P= .622	P= .211	P= .505
SEX	.0266	.0197	-.0003	-.0048	-.0071	-.0135
	(2889)	(2889)	(2889)	(2670)	(2670)	(2670)
	P= .153	P= .289	P= .989	P= .804	P= .712	P= .486
AGE	-.0413	-.0115	.0435	.0343	-.0072	-.0105
	(2886)	(2886)	(2886)	(2667)	(2667)	(2667)
	P= .026	P= .536	P= .020	P= .076	P= .711	P= .589
FJ1	-.1222	-.0531	-.0633	.3413	-.0193	-.1052
	(2889)	(2889)	(2889)	(2640)	(2640)	(2640)
	P= .000	P= .004	P= .001	P= .000	P= .321	P= .000
FJ2	-.2077	-.0902	-.1076	-.0923	.1748	-.1396
	(2889)	(2889)	(2889)	(2640)	(2640)	(2640)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
FJ3	-.0332	-.0144	-.0172	-.0195	.0390	-.0202
	(2889)	(2889)	(2889)	(2640)	(2640)	(2640)
	P= .075	P= .439	P= .356	P= .318	P= .045	P= .299
FJ4	-.1846	-.0802	-.0957	-.0827	-.1116	.2964
	(2889)	(2889)	(2889)	(2640)	(2640)	(2640)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
FJ5	-.0739	-.0321	-.0383	-.0442	-.0441	-.0453
	(2889)	(2889)	(2889)	(2640)	(2640)	(2640)
	P= .000	P= .084	P= .039	P= .023	P= .023	P= .020

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	FJ9	FJ10	FJ12	MJ1	MJ2	MJ4
FJ7	-.0631 (2889) P= .001	-.0274 (2889) P= .141	-.0327 (2889) P= .079	-.0368 (2640) P= .059	-.0250 (2640) P= .199	-.0207 (2640) P= .287
FJ8	-.0566 (2889) P= .002	-.0246 (2889) P= .187	-.0293 (2889) P= .115	-.0312 (2640) P= .108	-.0552 (2640) P= .005	-.0126 (2640) P= .517
FJ9	1.0000 (0) P= .	-.0414 (2889) P= .026	-.0493 (2889) P= .008	-.0225 (2640) P= .247	-.0529 (2640) P= .007	-.0324 (2640) P= .096
FJ10	-.0414 (2889) P= .026	1.0000 (0) P= .	-.0214 (2889) P= .250	-.0077 (2640) P= .693	.0168 (2640) P= .388	-.0203 (2640) P= .298
FJ12	-.0493 (2889) P= .008	-.0214 (2889) P= .250	1.0000 (0) P= .	-.0286 (2640) P= .142	-.0420 (2640) P= .031	.0218 (2640) P= .263
MJ1	-.0225 (2640) P= .247	-.0077 (2640) P= .693	-.0286 (2640) P= .142	1.0000 (0) P= .	-.0558 (2670) P= .004	-.0528 (2670) P= .006
MJ2	-.0529 (2640) P= .007	.0168 (2640) P= .388	-.0420 (2640) P= .031	-.0558 (2670) P= .004	1.0000 (0) P= .	-.0930 (2670) P= .000
MJ4	-.0324 (2640) P= .096	-.0203 (2640) P= .298	.0218 (2640) P= .263	-.0528 (2670) P= .006	-.0930 (2670) P= .000	1.0000 (0) P= .
MJ5	-.0433 (2640) P= .026	-.0193 (2640) P= .322	-.0228 (2640) P= .241	-.0248 (2670) P= .199	-.0438 (2670) P= .024	-.0414 (2670) P= .032
MJ8	.0721 (2640) P= .000	.0031 (2640) P= .872	-.0034 (2640) P= .862	-.0236 (2670) P= .223	-.0415 (2670) P= .032	-.0393 (2670) P= .042

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FJ9	FJ10	FJ12	MJ1	MJ2	MJ4
MJ9	.2471	-.0201	.0265	-.0261	-.0459	-.0434
	(2640)	(2640)	(2640)	(2670)	(2670)	(2670)
	P= .000	P= .303	P= .173	P= .178	P= .018	P= .025
MJ13	-.0255	.0011	.0016	-.2921	-.5116	-.4869
	(2640)	(2640)	(2640)	(2670)	(2670)	(2670)
	P= .190	P= .954	P= .936	P= .000	P= .000	P= .000
FED1	-.0473	-.0029	-.0248	.0022	.0427	-.0101
	(2804)	(2804)	(2804)	(2580)	(2580)	(2580)
	P= .012	P= .880	P= .189	P= .910	P= .030	P= .609
FED2	-.0355	-.0156	.0013	.0762	.0228	-.0115
	(2804)	(2804)	(2804)	(2580)	(2580)	(2580)
	P= .060	P= .410	P= .947	P= .000	P= .246	P= .558
FED3	-.2560	-.0514	-.0719	.0635	.0591	-.0669
	(2804)	(2804)	(2804)	(2580)	(2580)	(2580)
	P= .000	P= .005	P= .000	P= .001	P= .003	P= .000
FED4	-.0169	-.0120	-.0080	-.0255	-.0139	.0247
	(2804)	(2804)	(2804)	(2580)	(2580)	(2580)
	P= .372	P= .526	P= .673	P= .195	P= .481	P= .210
FED5	.2236	.0390	.0158	-.0495	-.0442	.0652
	(2804)	(2804)	(2804)	(2580)	(2580)	(2580)
	P= .000	P= .039	P= .404	P= .012	P= .025	P= .001
FED6	.1849	.0547	.1155	-.0369	-.0524	.0371
	(2804)	(2804)	(2804)	(2580)	(2580)	(2580)
	P= .000	P= .004	P= .000	P= .048	P= .008	P= .059
MED1	-.0630	-.0137	-.0250	.0555	.0130	-.0258
	(2502)	(2502)	(2502)	(2510)	(2510)	(2510)
	P= .002	P= .493	P= .211	P= .005	P= .516	P= .196
MED2	-.0375	.0088	.0014	.0000	.0401	.0106
	(2502)	(2502)	(2502)	(2510)	(2510)	(2510)
	P= .061	P= .660	P= .942	P= .998	P= .044	P= .596

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FJ9	FJ10	FJ12	MJ1	MJ2	MJ4
MED3	-.1537 (2502) P= .000	-.0070 (2502) P= .727	-.0650 (2502) P= .001	.0386 (2510) P= .052	.0570 (2510) P= .004	-.0857 (2510) P= .000
MED4	.1086 (2502) P= .000	-.0085 (2502) P= .669	-.0189 (2502) P= .345	-.0512 (2510) P= .010	-.0139 (2510) P= .487	.0496 (2510) P= .013
MED5	.1166 (2502) P= .000	.0344 (2502) P= .085	.0877 (2502) P= .000	-.0326 (2510) P= .103	-.0644 (2510) P= .001	.0996 (2510) P= .000
MED6	.1167 (2502) P= .000	-.0093 (2502) P= .643	.0931 (2502) P= .000	-.0316 (2510) P= .111	-.0613 (2510) P= .002	-.0031 (2510) P= .876
C1	.1197 (2886) P= .000	-.0105 (2886) P= .573	.0297 (2886) P= .111	-.0557 (2667) P= .004	-.0492 (2667) P= .011	.0686 (2667) P= .000
M1	.1268 (2886) P= .000	-.0213 (2886) P= .253	.0418 (2886) P= .025	-.0669 (2667) P= .001	-.0830 (2667) P= .000	.0843 (2667) P= .000
C2	.1197 (2889) P= .000	-.0036 (2889) P= .847	.0327 (2889) P= .079	-.0535 (2670) P= .006	-.0448 (2670) P= .021	.0590 (2670) P= .002
M2	.1349 (2889) P= .000	-.0169 (2889) P= .364	.0377 (2889) P= .043	-.0484 (2670) P= .012	-.0703 (2670) P= .000	.0753 (2670) P= .000
C3	.1105 (2889) P= .000	-.0061 (2889) P= .742	.0324 (2889) P= .081	-.0610 (2670) P= .002	-.0535 (2670) P= .006	.0643 (2670) P= .001
M3	.1346 (2889) P= .000	-.0316 (2889) P= .089	.0466 (2889) P= .009	-.0345 (2670) P= .074	-.0794 (2670) P= .000	.0800 (2670) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FJ9	FJ10	FJ12	MJ1	MJ2	MJ4
C4	.1048 (2889) P= .000	-.0034 (2889) P= .855	.0246 (2889) P= .186	-.0434 (2670) P= .025	-.0599 (2670) P= .002	.0642 (2670) P= .001
M4	.1339 (2889) P= .000	-.0345 (2889) P= .064	.0305 (2889) P= .101	-.0239 (2670) P= .216	-.0943 (2670) P= .000	.0872 (2670) P= .000
C5	.1123 (2889) P= .000	.0171 (2889) P= .357	.0405 (2889) P= .030	-.0679 (2670) P= .000	-.0450 (2670) P= .020	.0664 (2670) P= .001
M5	.1411 (2889) P= .000	.0040 (2889) P= .829	.0492 (2889) P= .008	-.0625 (2670) P= .001	-.0711 (2670) P= .000	.0973 (2670) P= .000
C6	.1051 (2887) P= .000	.0108 (2887) P= .563	.0359 (2887) P= .054	-.0575 (2668) P= .003	-.0393 (2668) P= .042	.0714 (2668) P= .000
M6	.1396 (2887) P= .000	-.0022 (2887) P= .904	.0435 (2887) P= .019	-.0516 (2668) P= .008	-.0867 (2668) P= .000	.1079 (2668) P= .000
TOTSONE	.0774 (2704) P= .000	.0024 (2704) P= .899	.0345 (2704) P= .073	-.0772 (2489) P= .000	-.1074 (2489) P= .000	.0796 (2489) P= .000
TOTSTWO	.0809 (2491) P= .000	.0083 (2491) P= .680	.0379 (2491) P= .059	-.0265 (2272) P= .206	-.0985 (2272) P= .000	.0609 (2272) P= .004
TOTSTH	.0853 (2068) P= .000	-.0193 (2068) P= .382	.0376 (2068) P= .086	-.0092 (1960) P= .683	-.0998 (1960) P= .000	.0398 (1960) P= .078
TOTSFOUR	.1173 (2791) P= .000	-.0157 (2791) P= .408	.0247 (2791) P= .192	.0032 (2578) P= .871	-.1266 (2578) P= .000	.0780 (2578) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FJ9	FJ10	FJ12	MJ1	MJ2	MJ4
TOTSFIVE	.0812	-.0056	.0277	-.0389	-.0899	.0480
	(2824)	(2824)	(2824)	(2604)	(2604)	(2604)
	P= .000	P= .768	P= .141	P= .047	P= .000	P= .014
TOTSSIX	.0971	.0036	.0193	-.0242	-.1277	.0625
	(2869)	(2869)	(2869)	(2656)	(2656)	(2656)
	P= .000	P= .848	P= .302	P= .213	P= .000	P= .001

	MJ5	MJ8	MJ9	MJ13	FED1	FED2
GROUP	.0053	.0019	.0032	.0805	-.0399	-.0193
	(2670)	(2670)	(2670)	(2670)	(2845)	(2845)
	P= .783	P= .923	P= .868	P= .000	P= .034	P= .303
SSIZE	-.2385	.0445	.0197	.0592	-.0402	-.0175
	(2670)	(2670)	(2670)	(2670)	(2845)	(2845)
	P= .000	P= .022	P= .309	P= .002	P= .032	P= .351
SEX	.0263	-.0381	-.0196	.0223	.0052	.0275
	(2670)	(2670)	(2670)	(2670)	(2845)	(2845)
	P= .174	P= .049	P= .310	P= .249	P= .783	P= .143
AGE	-.0320	-.0136	-.0253	.0239	.0476	.0482
	(2667)	(2667)	(2667)	(2667)	(2842)	(2842)
	P= .098	P= .484	P= .192	P= .216	P= .011	P= .010
FJ1	-.0176	-.0543	-.0519	-.0046	.0091	.0831
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .360	P= .005	P= .008	P= .814	P= .630	P= .000
FJ2	-.0930	-.0883	-.0852	.0960	.0857	-.0036
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .849
FJ3	-.0155	.0382	.0566	-.0343	-.0168	-.0126
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .425	P= .050	P= .004	P= .078	P= .374	P= .504
FJ4	-.0623	-.0450	-.0430	-.0180	-.0558	-.0418
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .000	P= .021	P= .027	P= .355	P= .003	P= .027
FJ5	.4883	-.0335	-.0367	- 0498	.0457	.0267
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .000	P= .085	P= .060	P= .011	P= .016	P= .157

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MJ5	MJ8	MJ9	MJ13	FED1	FED2
FJ7	-.0294	-.0279	-.0306	.0717	-.0072	-.0076
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .131	P= .152	P= .116	P= .000	P= .702	P= .686
FJ8	-.0090	.4128	.0663	-.0952	-.0287	-.0215
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .643	P= .000	P= .001	P= .000	P= .129	P= .254
FJ9	-.0433	.0721	.2471	-.0255	-.0473	-.0355
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .026	P= .000	P= .000	P= .190	P= .012	P= .060
FJ10	-.0193	.0031	-.0201	.0011	-.0028	-.0155
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .322	P= .872	P= .303	P= .954	P= .880	P= .410
FJ11	-.0228	-.0034	.0265	.0016	-.0248	.0013
	(2640)	(2640)	(2640)	(2640)	(2804)	(2804)
	P= .241	P= .862	P= .173	P= .936	P= .189	P= .947
MJ1	-.0248	-.0236	-.0261	-.2921	.0022	.0762
	(2670)	(2670)	(2670)	(2670)	(2580)	(2580)
	P= .199	P= .223	P= .178	P= .000	P= .910	P= .000
MJ2	-.0438	-.0415	-.0459	-.5116	.0427	.0228
	(2670)	(2670)	(2670)	(2670)	(2580)	(2580)
	P= .024	P= .032	P= .018	P= .000	P= .030	P= .246
MJ4	-.0414	-.0393	-.0434	-.4869	-.0101	-.0115
	(2670)	(2670)	(2670)	(2670)	(2580)	(2580)
	P= .032	P= .042	P= .025	P= .000	P= .609	P= .558
MJ5	1.0000	-.0185	-.0204	-.2290	-.0218	.0319
	(0)	(2670)	(2670)	(2670)	(2580)	(2580)
	P= .	P= .340	P= .291	P= .000	P= .268	P= .106
MJ8	-.0185	1.0000	-.0194	-.2173	-.0211	-.0160
	(2670)	(0)	(2670)	(2670)	(2580)	(2580)
	P= .340	P= .	P= .317	P= .000	P= .283	P= .416

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MJ5	MJ8	MJ9	MJ13	FED1	FED2
MJ9	-.0204	-.0194	1.0000	-.2402	-.0232	-.0176
	(2670)	(2670)	(0)	(2670)	(2580)	(2580)
	P= .291	P= .317	P= .	P= .000	P= .240	P= .373
MJ13	-.2290	-.2173	-.2402	1.0000	.0035	-.0[illegible]0
	(2670)	(2670)	(2670)	(0)	(2580)	(2580)
	P= .000	P= .000	P= .000	P= .	P= .861	P= .042
FED1	-.0218	-.0211	-.0232	.0035	1.0000	-.0179
	(2580)	(2580)	(2580)	(2580)	(0)	(2845)
	P= .268	P= .283	P= .240	P= .861	P= .	P= .339
FED2	.0319	-.0160	-.0176	-.0400	-.0179	1.0000
	(2580)	(2580)	(2580)	(2580)	(2845)	(0)
	P= .106	P= .416	P= .373	P= .042	P= .339	P= .
FED3	.1237	-.1332	-.1405	.0516	-.1518	-.1146
	(2580)	(2580)	(2580)	(2580)	(2845)	(2845)
	P= .000	P= .000	P= .000	P= .009	P= .000	P= .000
FED4	-.0634	-.0613	-.0387	.0618	-.0708	-.0535
	(2580)	(2580)	(2580)	(2580)	(2845)	(2845)
	P= .001	P= .002	P= .049	P= .002	P= .000	P= .004
FED5	-.0670	-.0424	.0730	.0160	-.0737	-.0557
	(2580)	(2580)	(2580)	(2580)	(2845)	(2845)
	P= .001	P= .031	P= .000	P= .415	P= .000	P= .003
FED6	-.0392	.3594	.1997	-.1653	-.0543	-.0410
	(2580)	(2580)	(2580)	(2580)	(2845)	(2845)
	P= .047	P= .000	P= .000	P= .000	P= .004	P= .029
MED1	.0559	-.0388	-.0425	.0031	.3405	.1383
	(2510)	(2510)	(2510)	(2510)	(2510)	(2510)
	P= .005	P= .052	P= .033	P= .875	P= .000	P= .000
MED2	.0527	.0167	-.0183	-.0423	.0016	.2816
	(2510)	(2510)	(2510)	(2510)	(2510)	(2510)
	P= .008	P= .403	P= .359	P= .034	P= .935	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MJ5	MJ6	MJ9	MJ13	FED1	FED2
MED3	.0203	-.1815	-.1648	.1256	-.0967	-.0811
	(2510)	(2510)	(2510)	(2510)	(2510)	(2510)
	P= .310	P= .000	P= .000	P= .000	P= .000	P= .000
MED4	-.0317	-.0537	.0211	.0217	-.0550	-.0443
	(2510)	(2510)	(2510)	(2510)	(2510)	(2510)
	P= .112	P= .007	P= .291	P= .277	P= .006	P= .026
MED5	-.0490	-.0367	.1992	-.0841	-.0539	-.0382
	(2510)	(2510)	(2510)	(2510)	(2510)	(2510)
	P= .014	P= .066	P= .000	P= .000	P= .007	P= .056
MED6	-.0275	.7007	.1342	-.2059	-.0303	-.0214
	(2510)	(2510)	(2510)	(2510)	(2510)	(2510)
	P= .169	P= .000	P= .000	P= .000	P= .130	P= .283
C1	-.0038	.0913	.0792	-.0468	-.0696	-.0163
	(2667)	(2667)	(2667)	(2667)	(2842)	(2842)
	P= .846	P= .000	P= .000	P= .016	P= .000	P= .385
M1	.0252	.0907	.0798	-.0416	-.1330	-.0114
	(2667)	(2667)	(2667)	(2667)	(2842)	(2842)
	P= .193	P= .000	P= .000	P= .031	P= .000	P= .544
C2	-.0290	.0896	.0787	-.0371	-.0683	-.0054
	(2670)	(2670)	(2670)	(2670)	(2844)	(2844)
	P= .134	P= .000	P= .000	P= .055	P= .000	P= .772
M2	.0059	.0909	.0756	-.0469	-.1217	-.0074
	(2670)	(2670)	(2670)	(2670)	(2844)	(2844)
	P= .762	P= .000	P= .000	P= .015	P= .000	P= .692
C3	-.0406	.0814	.0729	-.0229	-.0659	-.0092
	(2670)	(2670)	(2670)	(2670)	(2844)	(2844)
	P= .036	P= .000	P= .000	P= .238	P= .000	P= .623
M3	-.0391	.1073	.0816	-.0482	-.0972	-.0122
	(2670)	(2670)	(2670)	(2670)	(2844)	(2844)
	P= .043	P= .000	P= .000	P= .013	P= .000	P= .516

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MJ5	MJ6	MJ9	MJ13	FED1	FED2
C4	-.0377 (2670) P= .052	.0651 (2670) P= .000	.0793 (2670) P= .000	-.0319 (2670) P= .099	-.0740 (2844) P= .000	-.0126 (2844) P= .502
M4	-.0178 (2670) P= .359	.1050 (2670) P= .000	.0831 (2670) P= .000	-.0433 (2670) P= .025	-.0983 (2844) P= .000	-.0320 (2844) P= .088
C5	-.0479 (2670) P= .013	.0932 (2670) P= .000	.0805 (2670) P= .000	-.0330 (2670) P= .088	-.0763 (2844) P= .000	-.0295 (2844) P= .116
M5	-.0113 (2670) P= .560	.1041 (2670) P= .000	.0961 (2670) P= .000	-.0561 (2670) P= .004	-.1035 (2844) P= .000	-.0221 (2844) P= .238
C6	-.0516 (2668) P= .008	.0665 (2668) P= .000	.0808 (2668) P= .000	-.0399 (2668) P= .040	-.0631 (2842) P= .001	-.0122 (2842) P= .515
M6	-.0297 (2668) P= .125	.1030 (2668) P= .000	.0945 (2668) P= .000	-.0506 (2668) P= .009	-.1100 (2842) P= .000	-.0254 (2842) P= .175
TOTSONE	-.0733 (2489) P= .000	.1005 (2489) P= .000	.0344 (2489) P= .086	.0261 (2489) P= .194	-.0297 (2663) P= .125	-.0049 (2663) P= .802
TOTSTWO	-.1150 (2272) P= .000	.0649 (2272) P= .002	.0483 (2272) P= .021	.0413 (2272) P= .049	-.0543 (2452) P= .007	-.0073 (2452) P= .719
TOTSTH	-.0484 (1960) P= .032	.1399 (1960) P= .000	.0551 (1960) P= .015	-.0201 (1960) P= .374	-.0377 (2048) P= .088	-.0242 (2048) P= .274
TOTSFOUR	-.0401 (2578) P= .042	.1166 (2578) P= .000	.0679 (2578) P= .001	-.0174 (2578) P= .376	-.0842 (2748) P= .000	-.0183 (2748) P= .337

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MJ5	MJ8	MJ9	MJ13	FED1	FED2
TOTSFIVE	.0166 (2604) P= .396	.1135 (2604) P= .000	.0442 (2604) P= .024	-.0164 (2604) P= .403	-.0859 (2779) P= .000	-.0208 (2779) P= .274
TOTSSIX	-.0244 (2656) P= .208	.1078 (2656) P= .000	.0741 (2656) P= .000	-.0057 (2656) P= .769	-.0752 (2824) P= .000	-.0022 (2824) P= .907

	FED3	FED4	FED5	FED6	MED1	MED2
GROUP	.0518 (2845) P= .006	-.0333 (2845) P= .076	.0015 (2845) P= .936	-.0179 (2845) P= .339	-.0056 (2555) P= .778	-.0114 (2555) P= .565
SSIZE	-.1085 (2845) P= .000	.0370 (2845) P= .048	.0871 (2845) P= .000	.0458 (2845) P= .015	-.0491 (2555) P= .013	-.0131 (2555) P= .508
SEX	.0219 (2845) P= .244	-.0273 (2845) P= .146	.0015 (2845) P= .936	-.0163 (2845) P= .386	.0114 (2555) P= .566	.0113 (2555) P= .566
[illegible]	.0307 (2842) P= .101	-.0029 (2842) P= .877	-.0346 (2842) P= .065	-.0430 (2842) P= .022	.0329 (2552) P= .097	-.0097 (2552) P= .623
FJ1	.1866 (2804) P= .000	-.0446 (2804) P= .018	-.1214 (2804) P= .000	-.1296 (2804) P= .000	.1297 (2502) P= .000	-.0183 (2502) P= .361
FJ2	.1757 (2804) P= .000	.0187 (2804) P= .3[illegible]	-.0842 (2804) P= .000	-.2365 (2804) P= .000	.0276 (2502) P= .168	.0325 (2502) P= .104
FJ3	-.1071 (2804) P= .000	-.0500 (2804) P= .008	-.0524 (2804) P= .006	.3073 (2804) P= .000	-.0312 (2502) P= .119	-.0137 (2502) P= .4[illegible]
FJ4	-.1[illegible]79 (2804) P= .000	.0901 (2804) P= .000	.1180 (2804) P= .000	-.0414 (2804) P= .028	-.0987 (2502) P= .000	-.0051 (2502) P= .800
FJ5	.1715 (2804) P= .000	-.0779 (2804) P= .000	-.1001 (2804) P= .000	-.0859 (2804) P= .000	.0781 (2502) P= .000	.0243 (2502) P= .225

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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PEARSON CORRELATION COEFFICIENTS

	FED3	FED4	FED5	FED6	MED1	MED2
FJ7	.0147	.0555	-.0092	-.0724	-.0059	-.0097
	(2804)	(2804)	(2804)	(2804)	(2502)	(2502)
	P= .436	P= .003	P= .626	P= .000	P= .770	P= .627
FJ8	-.1828	-.0854	-.0843	.5182	-.0499	-.0220
	(2804)	(2804)	(2804)	(2804)	(2502)	(2502)
	P= .000	P= .000	P= .000	P= .000	P= .012	P= .272
FJ9	-.2560	-.0169	.2236	.1849	[illegible]	-.0375
	(2804)	(2804)	(2804)	(2804)	([illegible])	(2502)
	P= .000	P= .372	P= .000	P= .000	P= .002	P= .061
FJ10	-.0514	-.0120	.0390	.0547	-.0137	.0098
	(2804)	(2804)	(2804)	(2804)	(2502)	(2502)
	P= [illegible]	P= .526	P= .039	P= .004	P= .493	P= .660
FJ12	[illegible]	-.0080	.0158	.1155	-.0250	.0014
	([illegible])	(2804)	(2804)	(2804)	(2502)	(2502)
	P= [illegible]	P= .673	P= .404	P= .000	P= .211	P= .942
MJ1	[illegible]	-.0255	-.0495	-.0389	.0555	.0000
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .001	P= .195	P= .012	P= .046	P= .005	P= .998
MJ2	.0591	-.0139	-.0442	-.0528	.0130	.0401
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .003	P= .481	P= .025	P= .008	P= .516	P= .044
MJ4	-.0869	.0247	.0652	.0371	-.0258	.0105
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .000	P= .210	P= .001	P= .059	P= .196	P= .596
MJ5	.1237	-.0634	-.0670	-.0392	.0559	.0527
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .000	P= .001	P= .001	P= .047	P= .005	P= .008
MJ8	-.1332	-.0613	-.0424	.3594	-.0388	-.0167
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .000	P= .002	P= .031	P= .000	P= .052	P= .403

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FED3	FED4	FED5	FED6	MED1	MED2
MJ9	-.1405	-.0387	.0730	.1997	-.0425	-.0183
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .000	P= .049	P= .000	P= .000	P= .033	P= .359
MJ13	.0516	.0618	.0160	-.1653	.0031	-.0423
	(2580)	(2580)	(2580)	(2580)	(2510)	(2510)
	P= .009	P= .002	P= .415	P= .000	P= . 75	P= .034
FED1	-.1518	-.0708	-.0737	-.0543	.3405	.0016
	(2845)	(2845)	(2845)	(2845)	(2510)	(2510)
	P= .000	P= .000	P= .000	P= .004	P= .000	P= .935
FED2	-.1146	-.0535	-.0557	-.0410	.1383	.2816
	(2845)	(2845)	(2845)	(2845)	(2510)	(2510)
	P= .000	P= .004	P= .003	P= .029	P= .000	P= .000
FED3	1.0000	-.4526	-.4713	-.3469	.0711	.0228
	(0)	(2845)	(2845)	(2845)	(2510)	(2510)
	P= .	P= .000	P= .000	P= .000	P= .000	P= .253
FED4	-.4526	1.0000	-.2199	-.1619	-.0826	-.0403
	(2845)	(0)	(2845)	(2845)	(2510)	(2510)
	P= .000	P= .	P= .000	P= .000	P= .000	P= .044
FED5	-.4713	-.2199	1.0000	-.1685	-.1098	-.0352
	(2845)	(2845)	(0)	(2845)	(2510)	(2510)
	P= .000	P= .000	P= .	P= .000	P= .000	P= .078
FED6	-.3469	-.1619	-.1685	1.0000	-.0916	-.0435
	(2845)	(2845)	(2845)	(0)	(2510)	(2510)
	P= .000	P= .000	P= .000	P= .	P= .000	P= .029
MED1	.0711	-.0826	-.1098	-.0916	1.0000	-.0346
	(2510)	(2510)	(2510)	(2510)	(0)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .	P= .080
MED2	.0228	-.0403	-.0352	-.0435	-.0346	1.0000
	(2510)	(2510)	(2510)	(2510)	(2555)	(0)
	P= .253	P= .044	P= .078	P= .029	P= .080	P= .

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FED3	FED4	FED5	FED6	MED1	MED2
MED3	.4307	.0502	-.2519	-.3575	-.3754	-.1637
	(2510)	(2510)	(2510)	(2510)	(2555)	(2555)
	P= .000	P= .012	P= .000	P= .000	P= .000	P= .000
MED4	-.2862	.1519	.2489	.0024	-.1110	-.0484
	(2510)	(2510)	(2510)	(2510)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .905	P= .000	P= .014
MED5	-.3117	-.1170	.2658	.3475	-.0955	-.0416
	(2510)	(2510)	(2510)	(2510)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .035
MED6	-.1868	-.0775	-.0710	.5052	-.0535	-.0233
	(2510)	(2510)	(2510)	(2510)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .007	P= .238
C1	-.2369	.0531	.1432	.1782	-.1354	.0028
	(2842)	(2842)	(2842)	(2842)	(2552)	(2552)
	P= .000	P= .005	P= .000	P= .000	P= .000	P= .889
M1	-.2526	.0799	.1576	.1765	-.1422	-.0073
	(2842)	(2842)	(2842)	(2842)	(2552)	(2552)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .713
C2	-.2441	.0527	.1501	.1739	-.1347	-.0076
	(2844)	(2844)	(2844)	(2844)	(2555)	(2555)
	P= .000	P= .005	P= .000	P= .000	P= .000	P= .703
M2	-.2621	.0764	.1629	.1844	-.1498	-.0027
	(2844)	(2844)	(2844)	(2844)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .893
C3	-.2425	.0614	.1447	.1676	-.1406	-.0077
	(2844)	(2844)	(2844)	(2844)	(2555)	(2555)
	P= .000	P= .001	P= .000	P= .000	P= .000	P= .697
M3	-.2666	.0672	.1603	.1959	-.1534	.0014
	(2844)	(2844)	(2844)	(2844)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .946

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FED3	FED4	FED5	FED6	MED1	MED2
C4	-.2409 (2844) P= .000	.0672 (2844) P= .000	.1390 (2844) P= .000	.1704 (2844) P= .000	-.1467 (2555) P= .000	-.0120 (2555) P= .543
M4	-.2572 (2844) P= .000	.0654 (2844) P= .000	.1571 (2844) P= .000	.[illegible]949 (2844) P= .000	-.1179 (2555) P= .000	-.0183 (2555) P= .356
C5	-.2345 (2844) P= .000	.0556 (2844) P= .003	.1366 (2844) P= .000	.1845 (2844) P= .000	-.1574 (2555) P= .000	-.0128 (2555) P= .517
M5	-.2503 (2844) P= .000	.0713 (2844) P= .000	.1415 (2844) P= .000	.1950 (2844) P= .000	-.1433 (2555) P= .000	-.0056 (2555) P= .778
C6	-.2404 (2842) P= .000	.0586 (2842) P= .002	.1408 (2842) P= .000	.1726 (2842) P= .000	-.1421 (2553) P= .000	-.0065 (2553) P= .742
M6	-.2470 (2842) P= .000	.0624 (2842) P= .001	.1357 (2842) P= .000	.2121 (2842) P= .000	-.1349 (2553) P= .000	-.0037 (2553) P= .852
TOTSONE	-.1671 (2663) P= .000	.0453 (2663) P= .019	.0892 (2663) P= .000	.1512 (2663) P= .000	-.0672 (2384) P= .001	-.0186 (2384) P= .363
TOTSTWO	-.191[illegible] (2452) P= .000	.0322 (2452) P= .111	.1171 (2452) P= .000	.1630 (2452) P= .000	-.0875 (2167) P= .000	-.0116 (2167) P= .590
TOTSTH	-.2482 (2048) P= .000	.1027 (2048) P= .000	.0774 (2048) P= .000	.2013 (2048) P= .000	-.1079 (1863) P= .000	-.0165 (1863) P= .476
TOTSFOUR	-.1659 (2748) P= .000	.0308 (2748) P= .106	.0950 (2748) P= .000	.1894 (2748) P= .000	-.0950 (2465) P= .000	-.0147 (2465) P= .466

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	FED3	FED4	FED5	FED6	MED1	MED2
TOTSFIVE	-.2025 (2779) P= .000	.0660 (2779) P= .000	.1021 (2779) P= .000	.1640 (2779) P= .000	-.0735 (2492) P= .000	.0032 (2492) P= .673
TOTSSIX	-.2109 (2624) P= .000	.0262 (2624) P= .164	.1217 (2624) P= .000	.1919 (2824) P= .000	-.0823 (2540) P= .000	-.0232 (2540) P= .242

	MED3	MED4	MED5	MED6	C1	M1
GROUP	.0399 (2555) P= .044	-.0352 (2555) P= .075	-.0152 (2555) P= .441	.0017 (2555) P= .930	-.0824 (2946) P= .000	-.0179 (2946) P= .332
SSIZE	-.0575 (2555) P= .004	.0676 (2555) P= .001	.0570 (2555) P= .004	.0091 (2555) P= .645	.0871 (2946) P= .000	.0547 (2946) P= .003
SEX	.0170 (2555) P= .389	.0052 (2555) P= .791	-.0314 (2555) P= .112	-.0259 (2555) P= .190	-.1583 (2946) P= .000	-.0359 (2946) P= .052
AGE	.0471 (2552) P= .017	-.0332 (2552) P= .094	-.0368 (2552) P= .063	-.0410 (2552) P= .039	-.0062 (2943) P= .736	-.0025 (2943) P= .893
FJ1	.0859 (2502) P= .000	-.0849 (2502) P= .000	-.0973 (2502) P= .000	-.0747 (2502) P= .000	-.1906 (2886) P= .000	-.1756 (2886) P= .000
FJ2	.1764 (2502) P= .000	-.0657 (2502) P= .001	-.1624 (2502) P= .000	-.1287 (2502) P= .000	-.0718 (2886) P= .000	-.1048 (2886) P= .000
FJ3	-.1188 (2502) P= .000	.0507 (2502) P= .011	.1161 (2502) P= .000	.0760 (2502) P= .000	.0316 (2886) P= .090	.0220 (2886) P= .237
FJ4	-.0790 (2502) P= .000	.0994 (2502) P= .000	.1024 (2502) P= .000	-.0062 (2502) P= .756	.0882 (2886) P= .000	.1149 (2886) P= .000
FJ5	.0903 (2502) P= .000	-.0909 (2502) P= .000	-.0864 (2502) P= .000	-.0488 (2502) P= .015	-.0154 (2886) P= .408	-.0031 (2886) P= .869

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	MED3	MED4	MED5	MED6	C1	M1
FJ7	.0124	.0423	-.0334	-.0408	-.0025	-.0313
	(2502)	(2502)	(2502)	(2502)	(2886)	(2886)
	P= .536	P= .034	P= .094	P= .041	P= .894	P= .093
FJ8	-.1810	-.0105	.1504	.3256	.1037	.1020
	(2502)	(2502)	(2502)	(2502)	(2886)	(2886)
	P= .000	P= .598	P= .000	P= .000	P= .000	P= .000
FJ9	-.1537	.1066	.1166	.1187	.1197	.1268
	(2502)	(2502)	(2502)	(2502)	(2886)	(2886)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
FJ10	-.0070	-.0085	.0344	-.0093	-.0105	-.0213
	(2502)	(2502)	(2502)	(2502)	(2886)	(2886)
	P= .727	P= .669	P= .085	P= .643	P= .573	P= .253
FJ12	-.0650	-.0189	.0877	.0931	.0297	.0418
	(2502)	(2502)	(2502)	(2502)	(2886)	(2886)
	P= .001	P= .345	P= .000	P= .000	P= .111	P= .025
MJ1	.0388	-.0512	-.0326	-.0318	-.0557	-.0669
	(2510)	(2510)	(2510)	(2510)	(2667)	(2667)
	P= .052	P= .010	P= .103	P= .111	P= .004	P= .001
MJ2	.0570	-.0139	-.0644	-.0613	-.0492	-.0830
	(2510)	(2510)	(2510)	(2510)	(2667)	(2667)
	P= .004	P= .487	P= .001	P= .002	P= .011	P= .000
MJ4	[illegible]	.0496	.0996	-.0031	.0686	.0843
	[illegible]	(2510)	(2510)	(2510)	(2667)	(2667)
	P= .000	P= .013	P= .000	P= .876	P= .000	P= .000
MJ5	.0203	-.0317	-.0490	-.0275	-.0039	.0252
	(2510)	(2510)	(2510)	(2510)	(2667)	(2667)
	P= .310	P= .112	P= .014	P= .169	P= .846	P= .193
MJ8	-.1815	-.0537	-.0367	.7007	.0913	.0907
	(2510)	(2510)	(2510)	(2510)	(2667)	(2667)
	P= .000	P= .007	P= .066	P= .000	P= .000	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

EARSON CORRELATION COEFFICIENTS

	MED3	MED4	MED5	MED6	C1	M1
MJ9	-.1648 (2510) P= .000	.0211 (2510) P= .291	.1992 (2510) P= .000	.1342 (2510) P= .000	.0792 (2667) P= .000	.0796 (2667) P= .000
MJ13	.1256 (2510) P= .000	.0217 (2510) P= .277	-.0841 (2510) P= .000	-.2059 (2510) P= .000	-.0469 (2667) P= .016	-.0418 (2667) P= .031
FED1	-.0967 (2510) P= .000	-.0550 (2510) P= .006	-.0539 (2510) P= .007	-.0303 (2510) P= .130	-.0[illegible]95 (2842) P= .000	-.1330 (2842) P= .000
FED2	-.0811 (2510) P= .000	-.0443 (2510) P= .026	-.0382 (2510) P= .056	-.0214 (2510) P= .283	-.0163 (2842) P= .385	-.0114 (2842) P= .544
FED3	.4307 (2510) P= .000	-.2862 (2510) P= .000	-.3117 (2510) P= .000	-.1868 (2510) P= .000	-.2389 (2842) P= .000	-.2526 (2842) P= .000
FED4	.0502 (2510) P= .012	.1519 (2510) P= .000	-.1170 (2510) P= .000	-.0775 (2510) P= .000	.0531 (2842) P= .005	.0799 (2842) P= .000
FED5	-.2519 (2510) P= .000	.2489 (2510) P= .000	.2658 (2510) P= .000	-.0710 (2510) P= .000	.1432 (2842) P= .000	.1576 (2842) P= .000
FED6	-.3575 (2510) P= .000	.0024 (2510) P= .905	.3475 (2510) P= .000	.5052 (2510) P= .000	.1782 (2842) P= .000	.1785 (2842) P= .000
MED1	-.3754 (2555) P= .000	-.1110 (2555) P= .000	-.0955 (2555) P= .000	-.0535 (2555) P= .007	-.1354 (2552) P= .000	-.1422 (2552) P= .000
MED2	-.1637 (2555) P= .000	-.0484 (2555) P= .014	-.0416 (2555) P= .035	-.0233 (2555) P= .236	.0028 (2552) P= .889	-.0073 (2552) P= .713

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MED3	MED4	MED5	MED6	C1	M1
MED3	1.0000 (0) P= .	-.5245 (2555) P= .000	-.4[illegible] ([illegible]) P= [illegible]	-.2530 (2555) P= .000	-.1573 (2552) P= .000	-.1572 (2552) P= .000
MED4	-.5245 (2555) P= .000	1.0000 (0) P= .	[illegible] [illegible] P= [illegible]	-.0748 (2555) P= .000	.1330 (2552) P= .000	.1346 (2552) P= .000
MED5	-.4512 (2555) P= .000	-.1334 (2555) P= .000	[illegible]00 (0) P= .	-.0644 (2555) P= .001	.1474 (2552) P= .000	.1467 (2552) P= .000
MED6	-.2530 (2555) P= .000	-.0748 (2555) P= .000	-.0644 (2555) P= .001	1.0000 (0) P= .	.1112 (2552) P= .000	.1252 (2552) P= .000
C1	-.1573 (2552) P= .000	.1330 (2552) P= .000	.1474 (2552) P= .000	.1112 (2552) P= .000	1.0000 (0) P= .	.7837 (2946) P= .000
M1	-.1572 (2552) P= .000	.1346 (2552) P= .000	.1467 (2552) P= .000	.1252 (2552) P= .000	.7837 (2946) P= .000	1.0000 (0) P= .
C2	-.1470 (2555) P= .000	.1207 (2555) P= .000	.1460 (2555) P= .000	.1120 (2555) P= .000	.9261 (2946) P= .000	.7524 (2946) P= .000
M2	-.1622 (2555) P= .000	.1449 (2555) P= .000	.1456 (2555) P= .000	.1292 (2555) P= .000	.7810 (2946) P= .000	.8660 (2946) P= .000
C3	-.1453 (2555) P= .000	.1274 (2555) P= .000	.1483 (2555) P= .000	.1032 (2555) P= .000	.9002 (2946) P= .000	.7197 (2946) P= .000
M3	-.1726 (2555) P= .000	.1444 (2555) P= .000	.1564 (2555) P= .000	.1416 (2555) P= .000	.7660 (2946) P= .000	.8230 (2946) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MED3	MED4	MED5	MED6	C1	M1
C4	-.1441	.1244	.1526	.1101	.6803	.7042
	(2555)	(2555)	(2555)	(2555)	(2946)	(2946)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
M4	-.1931	.1409	.1711	.1400	.7364	.7906
	(2555)	(2555)	(2555)	(2555)	(2946)	(2946)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
C5	-.1360	.1185	.1488	.1218	.8364	.6758
	(2555)	(2555)	(2555)	(2555)	(2946)	(2946)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
M5	-.1714	.1336	.1590	.1447	.6948	.7295
	(2555)	(2555)	(2555)	(2555)	(2946)	(2946)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
C6	-.1423	.1162	.1501	.1148	.8352	.6728
	(2553)	(2553)	(2553)	(2553)	(2944)	(2944)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
M6	-.1855	.1265	.1755	.1549	.6811	.7139
	(2553)	(2553)	(2553)	(2553)	(2944)	(2944)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
TOTSONE	-.1381	.0943	.0962	.1411	.4463	.5258
	(2384)	(2384)	(2384)	(2384)	(2757)	(2757)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
TOTSTWO	-.1440	.1166	.1216	.1167	.4015	.4485
	(2167)	(2167)	(2167)	(2167)	(2539)	(2539)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
TOTSTH	-.1219	.0396	.1232	.1957	.4918	.5329
	(1863)	(1863)	(1863)	(1863)	(2118)	(2118)
	P= .000	P= .087	P= .000	P= .000	P= .000	P= .000
TOTSFOUR	-.1360	.0533	.1447	.1669	.4428	.5133
	(2465)	(2465)	(2465)	(2465)	(2847)	(2847)
	P= .000	P= .008	P= .000	P= .000	P= .000	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	MED3	MED4	MED5	MED6	C1	M1
TOTSFIVE	-.1639 (2492) P= .000	.0964 (2492) P= .000	.1224 (2492) P= .000	.1472 (2492) P= .000	.4605 (2880) P= .000	.5077 (2880) P= .000
TOTSSIX	-.1799 (2540) P= .000	.0999 (2540) P= .000	.1416 (2540) P= .000	.1831 (2540) P= .000	.4790 (2925) P= .000	.5123 (2925) P= .000

	C2	M2	C3	M3	C4	M4
GROUP	-.0896 (2949) P= .000	-.0433 (2949) P= .019	-.0758 (2949) P= .000	-.0488 (2949) P= .008	-.0681 (2949) P= .000	-.0425 (2949) P= .021
SSIZE	.1034 (2949) P= .000	.0873 (2949) P= .000	.1293 (2949) P= .000	.1139 (2949) P= .000	.1019 (2949) P= .000	.0770 (2949) P= .000
SEX	-.1695 (2949) P= .000	-.0369 (2949) P= .045	-.1745 (2949) P= .000	-.0329 (2949) P= .074	-.1633 (2949) P= .000	-.0570 (2949) P= .002
AGE	.0104 (2946) P= .574	.0045 (2946) P= .806	-.0108 (2946) P= .556	.0000 (2946) P= .999	-.0154 (2946) P= .404	.0040 (2946) P= .827
FJ1	-.1730 (2889) P= .000	-.1499 (2889) P= .000	-.1727 (2889) P= .000	-.1618 (2889) P= .000	-.1659 (2889) P= .000	-.1124 (2889) P= .000
FJ2	-.0714 (2889) P= .000	-.1184 (2889) P= .000	-.0576 (2889) P= .002	-.1091 (2889) P= .000	-.0629 (2889) P= .001	-.1350 (2889) P= .000
FJ3	.0309 (2889) P= .097	.0300 (2889) P= .107	.0329 (2889) P= .077	.0279 (2889) P= .134	.0318 (2889) P= .087	.0305 (2889) P= .101
FJ4	.0842 (2889) P= .000	.1054 (2889) P= .000	.0919 (2889) P= .000	.1141 (2889) P= .000	.0968 (2889) P= .000	.1164 (2889) P= .000
FJ5	-.0399 (2889) P= .032	-.0103 (2889) P= .580	-.0693 (2889) P= .000	-.0330 (2889) P= .076	-.0694 (2889) P= .000	-.0413 (2889) P= .026

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C2	M2	C3	M3	C4	M4
FJ7	.0007 (2889) P= .970	-.0241 (2889) P= .195	.0094 (2889) P= .613	-.0326 (2889) P= .080	.0109 (2889) P= .557	-.0301 (2889) P= .106
FJ8	.0990 (2889) P= .000	.1062 (2889) P= .000	.0963 (2889) P= .000	.1141 (2889) P= .000	.0943 (2889) P= .000	.1093 (2889) P= .000
FJ9	.1197 (2889) P= .000	.1349 (2889) P= .000	.1105 (2889) P= .000	.1346 (2889) P= .000	.1048 (2889) P= .000	.1339 (2889) P= .000
FJ10	-.0036 (2889) P= .847	-.0169 (2889) P= .364	-.0061 (2889) P= .742	-.0316 (2889) P= .089	-.0034 (2889) P= .855	-.0345 (2889) P= .064
FJ12	.0327 (2889) P= .079	.0377 (2889) P= .043	.0324 (2889) P= .081	.0486 (2889) P= .009	.0246 (2889) P= .186	.0305 (2889) P= .101
MJ1	-.0535 (2670) P= .006	-.0484 (2670) P= .012	-.0610 (2670) P= .002	-.0345 (2670) P= .074	-.0434 (2670) P= .025	-.0239 (2670) P= .216
MJ2	-.0446 (2670) P= .021	-.0703 (2670) P= .000	-.0535 (2670) P= .006	-.0694 (2670) P= .000	-.0599 (2670) P= .002	-.0943 (2670) P= .000
MJ4	.0590 (2670) P= .002	.0753 (2670) P= .000	.0643 (2670) P= .001	.0800 (2670) P= .000	.0642 (2670) P= .001	.0672 (2670) P= .000
MJ5	-.0290 (2670) P= .134	.0059 (2670) P= .762	-.0406 (2670) P= .036	-.0391 (2670) P= .043	-.0377 (2670) P= .052	-.0179 (2670) P= .355
MJ6	.0896 (2670) P= .000	.0909 (2670) P= .000	.0814 (2670) P= .000	.1073 (2670) P= .000	.0851 (2670) P= .000	.1050 (2670) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C2	M2	C3	M3	C4	M4
MJ9	.0787 (2670) P= .000	.0758 (2670) P= .000	.0729 (2670) P= .000	.0816 (2670) P= .000	.0793 (2670) P= .000	.0831 (2670) P= .000
MJ13	-.0371 (2670) P= .055	-.0469 (2670) P= .015	-.0229 (2670) P= .238	-.0482 (2670) P= .013	-.0319 (2670) P= .099	-.0433 (2670) P= .025
FED1	-.0663 (2844) P= .000	-.1217 (2844) P= .000	-.0659 (2844) P= .000	-.0972 (2844) P= .000	-.0740 (2844) P= .000	-.0983 (2844) P= .000
FED2	-.0054 (2844) P= .772	-.0074 (2844) P= .692	-.0092 (2844) P= .623	-.0122 (2844) P= .516	-.0126 (2844) P= .502	-.0320 (2844) P= .088
FED3	-.2441 (2844) P= .000	-.2621 (2844) P= .000	-.2425 (2844) P= .000	-.2666 (2844) P= .000	-.2409 (2844) P= .000	-.2572 (2844) P= .000
FED4	.0527 (2844) P= .005	.0764 (2844) P= .000	.0614 (2844) P= .001	.0672 (2844) P= .000	.0672 (2844) P= .000	.0654 (2844) P= .000
FED5	.1501 (2844) P= .000	.1629 (2844) P= .000	.1447 (2844) P= .000	.1603 (2844) P= .000	.1390 (2844) P= .000	.1571 (2844) P= .000
FED6	.1739 (2844) P= .000	.1844 (2844) P= .000	.1676 (2844) P= .000	.1959 (2844) P= .000	.1704 (2844) P= .000	.1949 (2844) P= .000
MED1	-.1347 (2555) P= .000	-.1498 (2555) P= .000	-.1406 (2555) P= .000	-.1534 (2555) P= .000	-.1467 (2555) P= .000	-.1179 (2555) P= .000
MED2	-.0076 (2555) P= .703	-.0027 (2555) P= .893	-.0077 (2555) P= .697	.0014 (2555) P= .946	-.0120 (2555) P= .543	-.0183 (2555) P= .356

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C2	M2	C3	M3	C4	M4
MED3	-.1470	-.1622	-.1453	-.1726	-.1441	-.1931
	(2555)	(2555)	(2555)	(2555)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
MED4	.1207	.1449	.1274	.1444	.1244	.1409
	(2555)	(2555)	(2555)	(2555)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
MED5	.1460	.1456	.1483	.1564	.1526	.1711
	(2555)	(2555)	(2555)	(2555)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
MED6	.1120	.1292	.1032	.1416	.1101	.1400
	(2555)	(2555)	(2555)	(2555)	(2555)	(2555)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
C1	.9261	.7610	.9002	.7660	.8803	.7364
	(2946)	(2946)	(2946)	(2946)	(2946)	(2946)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
M1	.7524	.8660	.7197	.8230	.7042	.7936
	(2946)	(2946)	(2946)	(2946)	(2946)	(2946)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
C2	1.0000	.7889	.9184	.7660	.8940	.7396
	(0)	(2949)	(2949)	(2949)	(2949)	(2949)
	P= .	P= .000	P= .000	P= .000	P= .000	P= .000
M2	.7889	1.0000	.7565	.8823	.7418	.9443
	(2949)	(0)	(2949)	(2949)	(2949)	(2949)
	P= .000	P= .	P= .000	P= .000	P= .000	P= .000
C3	.9184	.7565	1.0000	.7802	.9399	.7525
	(2949)	(2949)	(0)	(2949)	(2949)	(2949)
	P= .000	P= .000	P= .	P= .000	P= .000	P= .000
M3	.7660	.8823	.7802	1.0000	.7625	.8866
	(2949)	(2949)	(2949)	(0)	(2949)	(2949)
	P= .000	P= .000	P= .000	P= .	P= .000	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C2	M2	C3	M3	C4	M4
C4	.8940 (2949) P= .000	.7418 (2949) P= .000	.9399 (2949) P= .000	.7625 (2949) P= .000	1.0000 (0) P= .	.7779 (2949) P= .000
M4	.7396 (2949) P= .000	.8443 2949) 000	.7525 (2949) P= .000	.8866 (2949) P= .000	.7779 (2949) P= .000	1.0000 (0) P= .
C5	.8442 (2949) P= .000	[illegible] [illegible] P= .000	.8702 (2949) P= .000	.7239 (2949) P= .000	.8894 (2949) P= .000	.7360 (2949) P= .000
M5	.6951 (2949) P= .000	.7697 (2949) P= .000	.6894 (2949) P= .000	.7992 (2949) P= .000	.7110 (2949) P= .000	.8163 (2949) P= .000
C6	.8436 (2947) P= .000	.7043 (2947) P= .000	.8537 (2947) P= .000	.7188 (2947) P= .000	.8716 (2947) P= .000	.7189 (2947) P= .000
M6	.6788 (2947) P= .000	.7595 (2947) P= .000	.6813 (2947) P= .000	.7963 (2947) P= .000	.7028 (2947) P= .000	.8101 (2947) P= .000
TOTSONE	.4316 (2758) P= .000	.5095 (2758) P= .000	.4194 (2758) P= .000	.5087 (2758) P= .000	.4153 (2758) P= .000	.4951 (2758) P= .000
TOTSTWO	.4044 (2542) P= .000	.4850 (2542) P= .000	.3987 (2542) P= .000	.5046 (2542) P= .000	.3953 (2542) P= .000	.5039 (2542) P= .000
TOTSTH	.4917 (2121) P= .000	.5522 (2121) P= .000	.4958 (2121) P= .000	.5980 (2121) P= .000	.4651 (2121) P= .000	.5941 (2121) P= .000
TOTSFOUR	.4349 (2850) P= .000	.5399 (2850) P= .000	.4369 (2850) P= .000	.5677 (2850) P= .000	.4447 (2850) P= .000	.5906 (2850) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C2	M2	C3	M3	C4	M4
TOTSFIVE	.4462 (2883) P= .000	.5323 (2883) P= .000	.4643 (2883) P= .000	.5516 (2883) P= .000	.4644 (2883) P= .000	.5834 (2883) P= .000
TOTSSIX	.4662 (2928) P= .000	.5333 (2928) P= .000	.4793 (2928) P= .000	.5656 (2928) P= .000	.4828 (2928) P= .000	.5936 (2928) P= .000

	C5	M5	C6	M6	TOTSONE	TOTSTWO
GROUP	-.0331 (2949) P= .073	-.0211 (2949) P= .252	-.0338 (2947) P= .067	-.0337 (2947) P= .068	.0574 (2759) P= .003	-.0101 (2543) P= .610
SSIZE	.0859 (2949) P= .000	.0173 (2949) P= .347	.1143 (2947) P= .000	.0434 (2947) P= .018	.0730 (2759) P= .000	.1320 (2543) P= .000
SEX	-.1893 (2949) P= .000	-.0434 (2949) P= .018	-.1927 (2947) P= .000	-.0464 (2947) P= .012	.0559 (2759) P= .003	.0734 (2543) P= .000
AGE	-.0086 (2946) P= .640	-.0158 (2946) P= .392	-.0078 (2944) P= .672	-.0049 (2944) P= .792	.0246 (2757) P= .197	.0153 (2540) P= .440
FJ1	-.1627 (2889) P= .000	-.1587 (2889) P= .000	-.1838 (2887) P= .000	-.1639 (2887) P= .000	-.1415 (2704) P= .000	-.1182 (2491) P= .000
FJ2	-.0785 (2889) P= .000	-.1196 (2889) P= .000	-.0744 (2887) P= .000	-.1096 (2887) P= .000	-.0669 (2704) P= .000	-.0823 (2491) P= .000
FJ3	.0564 (2889) P= .002	.0488 (2889) P= .009	.0471 (2887) P= .011	.0413 (2887) P= .027	-.0269 (2704) P= .162	.0185 (2491) P= .356
FJ4	.0896 (2889) P= .000	.0998 (2889) P= .000	.0902 (2887) P= .000	.1056 (2887) P= .000	.0779 (2704) P= .000	.0859 (2491) P= .000
FJ5	-.0343 (2889) P= .065	-.0045 (2889) P= .810	-.0293 (2887) P= .115	-.0307 (2887) P= .099	.0086 (2704) P= .656	-.0107 (2491) P= .594

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	C5	M5	C6	M6	TOT[illegible]	TOTSTWO
FJ7	.0042	-.0300	.0088	-.0194	-.0018	-.0150
	(2889)	(2889)	(2887)	(2887)	(2704)	(2491)
	P= .821	P= .107	P= .638	P= .298	P= .927	P= .454
FJ8	.0963	.0988	.1026	.1016	.0807	.0669
	(2889)	(2889)	(2887)	(2887)	(2704)	(2491)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
FJ9	.1123	.1411	.1051	.1396	.0774	.0809
	(2889)	(2889)	(2887)	(2887)	(2704)	(2491)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
FJ10	.0171	.0040	.0108	-.0022	.0024	.0083
	(2889)	(2889)	(2887)	(2887)	(2704)	(2491)
	P= .357	P= .829	P= .563	P= .904	P= .699	P= .680
FJ12	.0405	.0492	.0359	.0435	.0345	.0379
	(2889)	(2889)	(2887)	(2887)	(2704)	(2491)
	P= .030	P= .008	P= .054	P= .019	P= .073	P= .059
MJ1	-.0679	-.0625	-.0575	-.0516	-.0772	-.0265
	(2670)	(2670)	(2668)	(2668)	(2489)	(2272)
	P= .000	P= .001	P= .003	P= .006	P= .000	P= .206
MJ2	-.0450	-.0711	-.0393	-.0867	-.1074	-.0985
	(2670)	(2670)	(2668)	(2666)	(2489)	(2272)
	P= .020	P= .000	P= .042	P= .000	P= .000	P= .000
MJ4	.0664	.0973	.0714	.1079	.0796	.0609
	(2670)	(2670)	(2668)	(2668)	(2489)	(2272)
	P= .001	P= .000	P= .000	P= .000	P= .000	P= .004
MJ5	-.0479	-.0113	-.0516	-.0297	-.0733	-.1150
	(2670)	(2670)	(2668)	(2668)	(2489)	(2272)
	P= .013	P= .560	P= .008	P= .125	P= .000	P= .000
MJ8	.0932	.1041	.0865	.1030	.1005	.0649
	(2670)	(2670)	(2668)	(2668)	(2489)	(2272)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .002

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C5	M5	C6	M6	TOTSONE	TOTSTWO
MJ9	.0805 (2670) P= .000	.0961 (2670) P= .000	.0808 (2668) P= .000	.0945 (2668) P= .000	.0344 (2489) P= .086	.0483 (2272) P= .021
MJ13	-.0330 (2670) P= .088	-.0561 (2670) P= .004	-.0399 (2668) P= .040	-.0506 (2668) P= .009	.0261 (2489) P= .194	.0413 (2272) P= .049
FED1	-.0763 (2844) P= .000	-.1035 (2844) P= .000	-.0631 (2842) P= .001	-.1100 (2842) P= .000	-.0297 (2663) P= .125	-.0543 (2452) P= .007
FED2	-.0295 (2844) P= .116	-.0221 (2844) P= .238	-.0122 (2842) P= .515	-.0254 (2842) P= .175	-.0049 (2663) P= .802	-.0073 (2452) P= .719
FED3	-.2345 (2844) P= .000	-.2503 (2844) P= .000	-.2404 (2842) P= .000	-.2470 (2842) P= .000	-.1871 (2663) P= .000	-.1915 (2452) P= .000
FED4	.0556 (2844) P= .003	.0713 (2844) P= .000	.0586 (2842) P= .002	.0624 (2842) P= .001	.0453 (2663) P= .019	.0322 (2452) P= .111
FED5	.1366 (2844) P= .000	.1415 (2844) P= .000	.1408 (2842) P= .000	.1357 (2842) P= .000	.0892 (2663) P= .000	.1171 (2452) P= .000
FED6	.1845 (2844) P= .000	.1950 (2844) P= .000	.1726 (2842) P= .000	.2121 (2842) P= .000	.1512 (2663) P= .000	.1630 (2452) P= .000
MED1	-.1574 (2555) P= .000	-.1433 (2555) P= .000	-.1421 (2553) P= .000	-.1349 (2553) P= .000	-.0672 (2384) P= .001	-.0875 (2167) P= .000
MED2	-.0128 (2555) P= .517	-.0056 (2555) P= .778	-.0065 (2553) P= .742	-.0037 (2553) P= .852	-.0186 (2384) P= .363	-.0116 (2167) P= .590

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	C5	M5	C6	M6	TOTSONE	TOTSTWO
MED3	-.1360 (2555) P= .000	-.1714 (2555) P= .000	-.1423 (2553) P= .000	-.1855 (2553) P= .000	-.1381 (2384) P= .000	-.1440 (2167) P= .000
MED4	.1185 (2555) P= .000	.1336 (2555) P= .000	.1162 (2553) P= .000	.1265 (2553) P= .000	.0943 (2384) P= .000	.1166 (2167) P= .000
MED5	.1488 (2555) P= .000	.1590 (2555) P= .000	.1501 (2553) P= .000	.1755 (2553) P= .000	.0962 (2384) P= .000	.1216 (2167) P= .000
MED6	.1218 (2555) P= .000	.1447 (2555) P= .000	.1148 (2553) P= .000	.1549 (2553) P= .000	.1411 (2384) P= .000	.1167 (2167) P= .000
C1	.8364 (2946) P= .000	.6948 (2946) P= .000	.8352 (2944) P= .000	.6811 (2944) P= .000	.4483 (2757) P= .000	.4015 (2539) P= .000
M1	.6758 (2946) P= .000	.7295 (2946) P= .000	.6728 (2944) P= .000	.7139 (2944) P= .000	.5258 (2757) P= .000	.4485 (2539) P= .000
C2	.8442 (2949) P= .000	.6951 (2949) P= .000	.8436 (2947) P= .000	.6788 (2947) P= .000	.4316 (2758) P= .000	.4044 (2542) P= .000
M2	.7082 (2949) P= .000	.7687 (2949) P= .000	.7043 (2947) P= .000	.7595 (2947) P= .000	.5095 (2758) P= .000	.4850 (2542) P= .000
C3	.8702 (2949) P= .000	.6894 (2949) P= .000	.8537 (2947) P= .000	.6813 (2947) P= .000	.4194 (2758) P= .000	.3987 (2542) P= .000
M3	.7239 (2949) P= .000	.7992 (2949) P= .000	.7188 (2947) P= .000	.7963 (2947) P= .000	.5087 (2758) P= .000	.5046 (2542) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	C5	M5	C6	M6	TOTSONE	TOTSTWO
C4	.8834	.7110	.8716	.7028	.4153	.3953
	(2949)	(2949)	(2947)	(2947)	(2758)	(2542)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
M4	.7360	.8183	.7189	.8101	.4951	.5039
	(2949)	(2949)	(2947)	(2947)	(2758)	(2542)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
C5	1.0000	.7575	.9173	.7309	.4024	.3821
	(0)	(2949)	(2947)	(2947)	(2758)	(2542)
	P= .	P= .000	P= .000	P= .000	P= .000	P= .000
M5	.7575	1.0000	.7459	.8979	.5033	.4902
	(2949)	(0)	(2947)	(2947)	(2758)	(2542)
	P= .000	P= .	P= .000	P= .000	P= .000	P= .000
C6	.9173	.7459	1.0000	.7605	.3982	.3613
	(2947)	(2947)	(0)	(2947)	(2756)	(2541)
	P= .000	P= .000	P= .	P= .000	P= .000	P= .000
M6	.7309	.8979	.7605	1.0000	.5003	.4577
	(2947)	(2947)	(2947)	(0)	(2756)	(2541)
	P= .000	P= .000	P= .000	P= .	P= .000	P= .000
TOTSONE	.4024	.5033	.3982	.5003	1.0000	.5447
	(2756)	(2758)	(2756)	(2756)	(0)	(2471)
	P= .000	P= .000	P= .000	P= .000	P= .	P= .000
TOTSTWO	.3821	.4902	.3613	.4577	.5447	1.0000
	(2542)	(2542)	(2541)	(2541)	(2471)	(0)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .
TOTSTH	.4668	.5513	.4652	.5488	.5736	.5651
	(2121)	(2121)	(2119)	(2119)	(2029)	(1834)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000
TOTSFOUR	.4222	.5566	.4159	.5457	.5289	.5361
	(2850)	(2850)	(2848)	(2848)	(2682)	(2468)
	P= .000	P= .000	P= .000	P= .000	P= .000	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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PEARSON CORRELATION COEFFICIENTS

	C5	M5	C6	M6	TOTSONE	TOTSTWO
TOTSFIVE	.4758 (2883) P= .000	.5798 (2883) P= .000	.4602 (2881) P= .000	.5707 (2881) P= .000	.4505 (2697) P= .000	.4810 (2489) P= .000
TOTSSIX	.4979 (2928) P= .000	.6006 (2928) P= .000	.5035 (2927) P= .000	.6213 (2927) P= .000	.4906 (2739) P= .000	.5234 (2523) P= .000

	TOTSTH	TOTSFOUR	TOTSFIVE	TOTSSIX
GROUP	.0223 (2122) P= .305	.0468 (2851) P= .012	.0022 (2884) P= .907	.0535 (2929) P= .004
SSIZE	.0913 (2122) P= .000	.0757 (2851) P= .000	-.0474 (2884) P= .011	-.0314 (2929) P= .089
SEX	.0377 (2122) P= .082	.0996 (2851) P= .000	.0648 (2884) P= .000	.0351 (2929) P= .058
AGE	.0180 (2120) P= .406	.0010 (2848) P= .957	-.0127 (2881) P= .497	-.0274 (2926) P= .139
FJ1	-.1299 (2068) P= .000	-.0735 (2791) P= .000	-.1042 (2824) P= .000	-.0664 (2869) P= .000
FJ2	-.1081 (2068) P= .000	-.1228 (2791) P= .000	-.0879 (2824) P= .000	-.1211 (2869) P= .000
FJ3	.0156 (2068) P= .479	-.0036 (2791) P= .851	.0030 (2824) P= .873	.0107 (2869) P= .565
FJ4	.0861 (2068) P= .000	.0942 (2791) P= .000	.0797 (2824) P= .000	.0928 (2869) P= .000
FJ5	.0436 (2068) P= .048	-.0320 (2791) P= .091	.0163 (2824) P= .388	-.0061 (2869) P= .743

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S

	TOTSTH	TOTSFOUR	TOTSFIVE	TOTSSIX
FJ7	-.0458	-.0436	-.0258	-.0260
	(2068)	(2791)	(2824)	(286[illegible])
	P= .037	P= .021	P= .170	P= .163
FJ8	.0940	.1033	.0914	.1073
	(2068)	(2791)	(2824)	(2869)
	P= .000	P= .000	P= .000	P= .000
FJ9	.0853	.1173	.0812	.0971
	(2068)	(2791)	(2824)	(2869)
	P= .000	P= .000	P= .000	P= .000
FJ10	-.0193	-.0157	-.0056	.0036
	(2068)	(2791)	(2824)	(2869)
	P= .382	P= .408	P= .768	P= .846
FJ12	.0378	.0247	.0277	.0193
	(2068)	(2791)	(2824)	(2869)
	P= .086	P= .192	P= .141	P= .302
MJ1	-.0092	.0032	-.0389	-.0242
	(1960)	(2578)	(2604)	(2656)
	P= .683	P= .871	P= .047	P= .213
MJ2	-.0998	-.1286	-.0899	-.1277
	(1960)	(2578)	(2604)	(2656)
	P= .000	P= .000	P= .000	P= .000
MJ4	.0398	.0780	.0480	.0625
	(1960)	(2578)	(2604)	(2656)
	P= .078	P= .000	P= .014	P= .001
MJ5	-.0484	-.0401	.0166	-.0244
	(1960)	(2578)	(2604)	(2656)
	P= .032	P= .042	P= .396	P= .208
MJ8	.1399	.1166	.1138	.1078
	(1960)	(2578)	(2604)	(2656)
	P= .000	P= .000	P= .000	P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

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PEARSON CORRELATION COEFFICIENTS

	TOTSTH	TOTSFOUR	TOTSFIVE	TOTSSIX
MJ9	.0551 (1960) P= .015	.0679 (2578) P= .001	.0442 (2604) P= .024	.0741 (2656) P= .000
MJ13	-.0201 (1960) P= .374	-.0174 (2578) P= .376	-.0164 (2604) P= .403	-.0057 (2656) P= .769
FED1	-.0377 (2048) P= .088	-.0842 (2748) P= .000	-.0859 (2779) P= .000	-.0782 (2824) P= .000
FED2	-.0242 (2048) P= .274	-.0183 (2748) P= .337	-.0208 (2779) P= .274	-.0022 (2824) P= .907
FED3	-.2482 (2048) P= .000	-.1859 (2748) P= .000	-.2025 (2779) P= .000	-.2109 (2824) P= .000
FED4	.1027 (2048) P= .000	.0308 (2748) P= .106	.0660 (2779) P= .000	.0262 (2824) P= .164
FED5	.0774 (2046) P= .000	.0950 (2748) P= .000	.1021 (2779) P= .000	.1217 (2824) P= .000
FED6	.2013 (2048) P= .000	.1894 (2748) P= .000	.1640 (2779) P= .000	.1919 (2824) P= .000
MED1	-.1078 (1863) P= .000	-.0950 (2465) P= .000	-.0735 (2492) P= .000	-.0823 (2540) P= .000
MED2	-.0165 (1863) P= .476	-.0147 (2465) P= .466	.0032 (2492) P= .873	-.0232 (2540) P= .242

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	TOTSTH	TOTSFOUR	TOTSFIVE	TOTSSIX
MED3	-.1219 (1863) P= .000	-.1360 (2465) P= .000	-.1639 (2492) P= .000	-.1799 (2540) P= .000
MED4	.0396 (1863) P= .087	.0533 (2465) P= .008	.0964 (2492) P= .000	.0999 (2540) P= .000
MED5	.1232 (1863) P= .000	.1447 (2465) P= .000	.1224 (2492) P= .000	.1416 (2540) P= .000
MED6	.1957 (1863) P= .000	.1669 (2465) P= .000	.1472 (2492) P= .000	.1831 (2540) P= .000
C1	.4918 (2118) P= .000	.4428 (2847) P= .000	.4605 (2880) P= .000	.4790 (2925) P= .000
M1	.5329 (2118) P= .000	.5133 (2847) P= .000	.5077 (2880) P= .000	.5123 (2925) P= .000
C2	.4917 (2121) P= .000	.4349 (2850) P= .000	.4482 (2883) P= .000	.4662 (2928) P= .000
M2	.5522 (2121) P= .000	.5399 (2850) P= .000	.5323 (2883) P= .000	.5333 (2928) P= .000
C3	.4958 (2121) P= .000	.4369 (2850) P= .000	.4643 (2883) P= .000	.4793 (2928) P= .000
M3	.5960 (2121) P= .000	.5677 (2850) P= .000	.5518 (2883) P= .000	.5658 (2928) P= .000

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

PEARSON CORRELATION COEFFICIENTS

	TOTSTH	TOTSFOUR	TOTSFIVE	TOTSSIX
C4	.4651 (2121) P= .000	.4447 (2850) P= .000	.4644 (2883) P= .000	.4828 (2928) P= .000
M4	.5941 (2121) P= .000	.5906 (2850) P= .000	.5834 (2883) P= .000	.5936 (2928) P= .000
C5	.4668 (2121) P= .000	.4222 (2850) P= .000	.4758 (2883) P= .000	.4979 (2928) P= .000
M5	.5513 (2121) P= .000	.5566 (2850) P= .000	.5798 (2883) P= .000	.6006 (2928) P= .000
C6	.4652 (2119) P= .000	.4159 (2848) P= .000	.4602 (2881) P= .000	.5035 (2927) P= .000
M6	.5488 (2119) P= .000	.5457 (2848) P= .000	.5707 (2881) P= .000	.6213 (2927) P= .000
TOTSONE	.5736 (2029) P= .000	.5289 (2682) P= .000	.4585 (2697) P= .000	.4906 (2739) P= .000
TOTSTWO	.5651 (1834) P= .000	.5361 (2468) P= .000	.4810 (2489) P= .000	.5234 (2523) P= .000
TOTSTH	1.0000 (0) P= .	.6714 (2067) P= .000	.5851 (2077) P= .000	.5931 (2110) P= .000
TOTSFOUR	.6714 (2067) P= .000	1.0000 (0) P= .	.5613 (2787) P= .000	.5678 (2831) P= .000
TOTSFIVE	.5851 (2077) P= .000	.5613 (2787) P= .000	1.0000 (0) P= .	.6579 (2863) P= .000
TOTSSIX	.5931 (2110) P= .000	.5678 (2831) P= .000	.6579 (2863) P= .000	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 2-TAILED SIG)

" . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

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